

THE PEDAGOGICAL SEMINARY AND
**JOURNAL OF
GENETIC PSYCHOLOGY**

Child Behavior, Animal Behavior,
and Comparative Psychology

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AN INVESTIGATION OF THE RELATIONSHIP
BETWEEN CHILDREN'S LANGUAGE AND
THEIR PLAY*

War Manpower Commission

SIDNEY Q. JANUS

A. INTRODUCTION

Since the publication of Piaget's penetrating researches into the language and thought of the child more than a decade ago, considerable interest has been focused upon the *egocentric* nature of child speech. Piaget himself first used the term *coefficient of egocentrism* in his work entitled *The Language and Thought of the Child*, based on his classic experiments in Geneva. His findings were widely heralded by psychologists in America and abroad, notably by Claparède who penned a Preface wherein he prophesied an enthusiastic reception for Piaget's ingenious methodology.

Work in this country on the egocentricity of children's language has yielded evidence not entirely in agreement with the data reported from Geneva. There seems to be considerable justification for the statement that "the proportion of egocentric talk varies widely with circumstances" (24, p. 583).

1. *The Problem of This Investigation*

The major task of this study is to check into these "circumstances" in order to determine their nature, and the extent and kind of their influence, by an examination of the language of children as it relates to their play. It is well known that children share a wide variety of experiences in their play. This, it is assumed, makes for a greater number of situations than is obtainable by observing children engaged in one particular kind of activity. The following problem may thus be formulated: Given a sample of children at various age levels in the preschool population, taken from a number of widely scattered communities, and representing different occupational levels with respect to their parentage, to what extent, and how consistently

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does their language vary with the different situations arising out of their play? Evidence produced heretofore amply supports the proposition that the language of children is a function of such variables as their age, intelligence, and socio-economic status. Yet if language is an instrumentality of social or *shared* behavior, it is precisely with respect to such a context that it is most properly studied. And if children at the age when investigators have found their speech predominantly egocentric should display a significant amount of socialized talk in certain play situations, may not this be attributed to the social influences arising out of such a factor as group play?

The writer has sought to determine to what extent play serves as a *selector* of language. If egocentric language is restricted to certain circumstances, which are they? If, as common sense holds, different play situations should stimulate different language functions, then it is significant to demonstrate the consistency and the kind of these variations at the different age levels studied here. The attempt has been made to determine the influence of such play variables as group play, passive play, play in pairs, etc., on the language of children. An answer has been sought to the question of whether or not the failure to duplicate the findings of Piaget in some instances has arisen out of a change in the experimental situation in those cases, or is inherent in the Piaget classification. Finally, the social implications of children's language have been put to the test of objective analysis.

B. HISTORICAL BACKGROUND

Objective investigation of children's language is of quite recent date. The genetic psychology of language is as yet a field of science cultivated but sparsely by the sociologist and psychologist alike. Some of the pages of the *Pedagogical Seminary* were devoted to the language aspect of developmental psychology during the first and second decades of this century (*e.g.*, 2, 3, 4, 27, 28). It was not until the third decade was well advanced, however, that a major work appeared, focusing its attention on language *per se*. Piaget's novel approach to the study of child logic culminated in his publication of *The Language and Thought of the Child* in 1926 (32), a work which has influenced subsequent investigators, notably McCarthy (22) and Fisher (10).

Before Piaget, attention was largely centered upon (a) the *analytical description* of children's language. In the last two decades, new light has been thrown upon (b) the *functional aspects* (as defined in 2 below) of child speech. Thus, a summary of the previous literature dealing with children's language falls conveniently into these two classes. Such a treatment, moreover, serves to make more apparent the deficiencies of Piaget's study which investigators following him attempted to overcome; it may also clarify the *purpose* of this study described above. The significance of the Piaget work remains undiminished, however, inasmuch as the methodology basic therein has not since been radically modified, although it has been intensified and more widely applied.

1. *Analytical Studies Antedating Piaget*

The well-known early studies of Preyer (34), Moore (23), Shinn (36), and Major (20) were restricted to recording the growth in vocabulary of individual children. They were largely biographical or anecdotal in nature and may hardly be considered of any scientific value. The work of the Sterns (38, 39, 40) is significant in that they emphasized the investigation of language as a psychological problem. The early investigators made a real contribution in that the impetus to study the accumulation of vocabulary did permit of objective treatment (*cf.* Waddel [42]). The enormous acceleration in growth of vocabulary occurring during the latter part of the second year of life was reported repeatedly by a number of investigators. Thus, Bateman (2) found that three girls aged 28 months had vocabularies, respectively, of 405, 628, and 308 words. Of these, *nouns* constituted more than half of the total number in all three cases, with verbs somewhat less. Significant vocabulary studies have since multiplied, among which those of Descouedres (8) at Geneva and M. Smith at Iowa (37) are noteworthy. Both of these investigators employed a question-and-answer technique whereby children were requested to respond to questions or requests, and both obtained similar results. That is to say, in both the French and English environments the total vocabulary as a function of age averaged the same, with the relative importance of the various parts of speech quite similar in the two investigations. Descouedres set out to observe the vocabulary, style of speech, and

the variation in thinking of children of different ages. Although many of her subjects were observed at play, no data are reported bearing on the relationship of different play situations to language, a deficiency which this study hopes to overcome. In Smith's study, words were elicited by a standard set of questions, or by presenting pictures and objects to her subjects. On the basis of records obtained from 273 children, Smith found that the average number of words in children's vocabularies increases from zero at eight months to about 2,500 at six years, this acceleration being extremely rapid and steady.

A number of writers have delineated the various stages in speech development. Thus, Nice (27, 28), using the all-day conversation method of recording children's speech, traces the following stages of sentence formation: From four to nine months, the single-word stage is predominant; between 13 and 27 months, the first sentence appears, although most of this category consists of incomplete sentences; the short sentence stage of from 3.5 to 4.5 words next ensues; after four years of age, the complete sentence stage appears, consisting of sentences of six to eight words. These stages are based on the observation of English speaking children, with a sample ranging from 3 to 18 cases. Smith (37) used a more reliable sample of 88 children from two to five years of age. She found an increasing tendency toward the use of longer and more complete sentences with an increase in age, with declarative sentences predominant at all ages; exclamatory sentences were found to vary inversely with age.

An *overall* analysis of the stages in the development of speech was suggested by F. H. Allport (1) whose classification has served as a model for later treatments, and which has since been frequently cited in the literature of social and child psychology. According to Allport, language develops through (a) random articulation during the first half year of life, when infants produce simple sounds, particularly vowel sounds, which are followed by vowel-consonant combinations, and, finally, vowels with labials and fricatives; (b) a babbling stage, wherein circular reflexes between the sound of the syllable and the response of speaking it are fixated, so that articulation of a given syllable provides a twofold stimulation to the individual, i.e., auditory stimuli and kinaesthetic-tactual stimuli

arising from hearing the word and from responses connected with throat, laryngeal, and tongue movements in pronouncing it; thus in the latter part of the first year, the infant establishes certain conditions which enable him to imitate the speech of others at some future time; (*c*) calling upon the child's repertoire of articulations by others in his environment who present auditory stimuli to him, inasmuch as the auditory stimulus of a sound alone is sufficient to evoke the response of making that sound at this stage; under these conditions, the child will repeat only those sounds which he has already practiced; (*d*) the process of conditioning, whereby the child's articulations are conditioned by objects and situations; it is here that the naming habits have their origin, for in the course of time, the child's random articulations become attached to a variety of situations.

Gesell (12) and his co-workers have investigated these random infantile articulations. In a detailed study of the total vocal output of a six-months-old baby over a period of 24 hours, 64 different sounds were distinguished.

What, then, have been the major indications in language study before Piaget? The material summarized thus far has served to emphasize two such indications, to wit: (*a*) certain definable stages in the development of speech and (*b*) stages in the development of vocabulary. In the light of recent experimental studies, the findings reported by the investigators mentioned above may be conveniently assembled here so as to present a coherent picture of what seems to be the true language development of children in our culture.

During the first half-year of life, infants spontaneously utter simple sounds, beginning with purely vowel sounds such as *ā* and *ā*, then proceeding to combinations of vowels and consonants such as *mā*, *gā*, and *āng*, finally producing vowel-labial and vowel-fricative combinations, e.g., *pāp*, *ūv* and *lāb*. With practice, these sounds improve in smoothness and facility.

Following his vocal play, the infant learns to repeat sounds, witness the familiar "*da, da, da*," and "*ma, ma, ma*." By this incessant babbling, our infant inevitably comes up against conditions which enable him to imitate the speech of those in his environment. Sounds are thus readily evoked from him by the auditory stimulus presented by others. Usually, however, those sounds are evoked which

the child has already spontaneously practised. A sound which the child has never practised will rarely if ever be repeated by him. Thus, the child may be said to imitate himself, not the speech of others.

Naming habits whereby the child learns to associate sounds with specific objects and persons develop by conditioning. Thus, random articulations become attached to situations, and the child acquires the use of verbs. Similarly, as the child's articulations continue to be conditioned by objects and situations, he proceeds to acquire the use of other parts of speech, e.g., adverbs, and of grammatical inflections. It is significant that children very soon in the development of their speech use sentences *per se*. These may consist of one word, or a number of words. It is questionable as to how soon words used by children may be classified as parts of speech; one or two words uttered by the child may constitute his entire sentence.

How rapid is the growth of vocabulary from year to year? Up to the present time, it would seem that there is an extremely rapid but steady increase in vocabulary up to six years. Boys and girls do not differ significantly in this regard. Nor is social status a significant factor, as significant, at any rate, as is the factor of intelligence.

2. *Studies of the Functional Aspects of Children's Language*

Beginning with Piaget, considerable attention was focused upon a functional approach to children's language. By a functional approach is meant an investigation of the needs which the child tends to satisfy when he talks. Thus, Piaget (32) emphasized the function of language responses in relation to the child's environment under circumstances where the child *talks of his own accord*. He set out with these questions in mind: "*Why does the child talk?*" and "*What are the functions of language?*" Two boys at the *Maison des Petits de l'Institut Rousseau* were observed for a month, and in each case the conversation and its context were recorded in minute detail. The boys, aged six and one-half, were left to their own devices in a schoolroom which supplied "a first-class field of observation for everything connected with the study of the social life and of the language of childhood" (p. 5). The material was collected, arranged, and classified into functional categories, the

basic classification being that of a dichotomy of egocentric and socialized speech functions. Piaget defined egocentric conversation as that in which the child does not care to whom he is speaking or who is listening; the child talks about himself and is entirely disinterested in the remarks of others. Egocentric speech may be of three forms: (a) repetition, or talk for the sake of talking; (b) monologue, where no one is addressed, as though the child were thinking aloud; (c) dual or collective monologue, where another person merely acts as stimulus or receiver, but whose point of view is never taken into account. Socialized speech may be subdivided into five forms: (a) adapted information, where thoughts or ideas are exchanged, or where a common aim may be pursued; (b) criticism, involving the child's remarks about the work or behavior of others, and specified in relation to an audience; (c) commands, requests and threats, amounting to definite interaction between one child and another; (d) questions asked by children, and (e) answers made to real questions.

Many writers have criticized the artificiality of Piaget's classification ignoring the fact that Piaget himself made repeated reference to the weaknesses inherent therein, stressing that "what is more important, however, is that it should stand the test of practical application, i. e., that any reader who has made himself familiar with our criteria should place the same phrases more or less in the same categories" (p. 11). By using a rather simple technique, Piaget proceeded to the measurement of egocentrism. He assumed spontaneous language to be the sum total of all remarks in his first seven categories, thus excluding those which are made in answer to questions by adults or children. The ratio of egocentric language to this spontaneous language was termed the *coefficient of egocentrism* by Piaget. (A more appropriate term might be *index*.) This was found to be quite similar for both subjects (0.43 ± 0.06 and 0.47 ± 0.04) with a variability of 0.04 to 0.57 for one, and 0.31 to 0.59 for the other. The same calculation carried out for some 1,500 remarks in another class-room of the Institute of children between five and seven yielded a coefficient of egocentrism equal to 0.45. For children between the ages of three and five, a coefficient between 0.54 and 0.60 was found; for two boys aged seven, it was 0.30 and 0.27 respectively. Piaget concluded that up to a certain

age children think and act more egocentrically than adults, and share each other's intellectual life less than adults. The child, he asserts, speaks first and foremost to himself, and speech is therefore an accompaniment or reinforcement of individual activity before it can be used to socialize human behavior. Why is "collective monologue" so prominent in children? The answer according to Piaget rests with the child's inability for verbal continence, not knowing what it is to keep a thing to himself. Moreover, while the adult may think socially even when alone, the child under seven thinks egocentrically even in the society of others. Child society, Piaget points out, is a society in which individual and social life are not differentiated. But as the child grows older, his degrees of egocentrism decreases.

Piaget's material is generally not considered adequate for scientific purposes. One may seriously quarrel, too, with his conclusions based on findings limited to the *Maison des Petits*. Therefore, evidence in confirmation or dispute of his findings must be sought in the work of other investigators who have applied his technique more extensively.

Particularly confirmatory is an American study by Rugg, Krueger, and Sondergaard (35). These investigators recorded over 3,000 remarks of 27 kindergarten children through a series of 15 minute intervals on a number of different days. Of the sum total, about 40 per cent contained elements of self-assertiveness, while less than one per cent contained ideas of self-depreciation. Only four per cent of the remarks showed evidence of "social consciousness." The authors conclude that a kindergarten child is relatively egocentric and that he is a rather "unsocial defender of his individuality."

Luria (19) found that egocentric speech appeared when the child was confronted with a difficult situation, wherein his so-called egocentrism serves as a mechanism for the solution of the problem. Thinking aloud, therefore, constitutes the child's attempts directed at a solution of his difficulties. Indeed, thinking aloud also constitutes the child's expression of his attitudes toward aggression (11) and sympathy (25). Investigators have found language records in such instances invaluable as well as indispensable.

The two remaining studies, of McCarthy (22) and of Fisher (10), are contradictory in their disagreement and concurrence, re-

spectively, with the findings of Piaget. McCarthy attempted to overcome the inadequacy of Piaget's investigation by studying the function of language in the child's life on the basis of samples of the running conversation of a large number of children selected so as to give a random sampling of the population. One hundred forty children were selected so as to give a distribution both social and intellectual, typical of the city whence they were drawn. These subjects ranged in age from 18 to 54 months, with 20 children drawn at each of the age levels of 18, 24, 30, 36, 42, 48, and 54 months. Each child was observed individually at home or in some familiar environment such as nursery school. For each child, 50 consecutive responses were recorded. Rapport was facilitated by the presentation of picture-books and toys standardized throughout the experiment. Thus, it will be noted that this method of procedure differs from that of Piaget in that (a) the child talks to an adult rather than to other children; (b) the same amount of data is obtained for each child; (c) the situation is more nearly the same for all subjects, and (d) a considerably larger sample representative of the population is employed.

McCarthy classified her data into (a) comprehensible responses, i.e., all responses understandable by the experimenter; (b) semi-comprehensible responses, wherein certain key words essential to the understanding of the sentence were lacking; (c) incomprehensible vocalization, entirely devoid of meaning to the hearer. These responses were in turn sub-divided into (a) single sound, (b) repetition of the same sound, and (c) series of varied sounds. In the functional analysis of her data, McCarthy employed the Piaget classification outlined above with the addition of a category for emotionally toned responses, another for social phrases, and one for dramatic imitation under the category of socialized speech, while the category of adapted information in Piaget's classification was more sharply delineated to include naming, remarks about the immediate situation, remarks associated with the situation, and irrelevant remarks. It should be noted, too, that McCarthy extended the category of commands, requests, and threats to encompass all emotionally toned remarks. The categories included under egocentric speech were used intact.

McCarthy reported that egocentric responses constituted a very

small proportion of the total number of responses at *all age levels*. McCarthy's findings showed no trends with age, nor any noticeable sex differences, as regards egocentricity. Adapted information was the largest single group of socialized speech, showing a marked increase with age, attaining 50 per cent by 54 months. Criticism hardly appeared in the 18 months-old subjects, seeming to be related more to individual personality traits and showing no tendency to change with age or sex. Emotionally toned responses were of relatively less importance as age increased. Questions and answers showed an increase with age, while dramatic imitation showed no definite tendency in relation to chronological age, seeming to be related more to personality factors of the individual children, to their habits of play, and to chance factors in the situation. Social phrases constituted about three per cent of the total number of responses and about 19 per cent of 18 months-old boys' responses. In the upper ages, they decrease in importance. When the functional categories were examined in relation to paternal occupation, a much higher proportion of adapted information and of questions at all ages was revealed among the children of the upper occupational groups.

In striking substantiation of Piaget's results are those incorporated in the monograph of Fisher (10). Here may be found a more equitable basis for comparison, inasmuch as Fisher did not obstruct the influences of free play which are indispensable in carrying out effectively the methodology of Piaget. Again, it must be emphasized, the important functional aspects of the child's language develop in relation to his environment (*cf.* Dewey [9]). What are the situations in which the child is placed that bring about certain language responses?—this is a major question in the genetic study of language. Although Fisher was amply cognizant of this facet of the problem, her study presents other limitations. Her data are based on the verbatim records of each of 72 children observed for a period of nine hours, extending over three separate forenoons. The subjects numbered 35 boys and 37 girls, ranging in age from 22 to 60 months. While the children were homogenous in physical development, mental ability, and occupational status of their families, having been drawn from the Child Development Institute of Teachers College, Columbia University, it is nevertheless felt that

beyond some very significant age comparisons, the application of the findings is necessarily limited. It yet remains for some investigation of children's language to take cognizance of the influence of free play on all of the social implications of that language. Obviously, the treatment of individual language records for separate children observed independently of one another so far as *recording* their speech is concerned, limits the degree to which these social implications may become apparent. The very essence of language rests with the *sharing of behavior*. In the opinion of Dewey, its primary motive is to influence the activity of others.

In her functional analysis, Fisher classified her data in accordance with the following scheme (p. 12):

- Category I—Self as subject;
- Category II—Other person as subject;
- Category III—Thing as subject;
- Category IV—Non-verbal or incomprehensible remarks;

of which only the first three were used in the determination of the relative amount of time that children spend talking about themselves, compared with the amount of time they spend talking about other people or things. Fisher asserts:

Language may be primarily social in function, but any attempt to limit its purposes to communication distorts the developmental picture and blots out discriminating differences in individual patterns. From the point of view of child psychology, the most important speech patterns are those which differentiate individual children in respect to their interests and desires (p. 19).

There is no quarreling with this statement; nor is there any quarrel, it is felt, with the criticism levelled at the restrictions surrounding a functional analysis which does not take into consideration the trend of language in *inter-communication*.

Fisher found a Pearson r of .45 between the two variables of chronological age and percentage of remarks in Category I. A high positive relationship was indicated for increased age and Category II, i.e., r of $.69 \pm .04$. For Category III and chronological age, r was equal to $-.67 \pm .04$, indicating a negative relationship. These findings need no elaboration. What is more significant, how-

ever, is the close agreement with regard to the coefficient of egocentricity between Piaget's and Fisher's results. In the latter study, this coefficient was determined by dividing Category I by Category II and III, and ranged from .31 to .59 for all age groups, with a mean at .51. Thus Fisher is led to agree with Piaget's contention that speech "serves to accompany and reinforce individual activity" in the young child.

With regard to questions and answers, Fisher reports that the percentage of the former increased rapidly with advance in chronological age, with a definite peak at the beginning of the third year, while the latter showed a very similar trend, with a peak at the end of the fourth year. The percentage of commands in the sum total of remarks was higher at each age level than the percentage of questions. Considered in relation to total speech, McCarthy's percentages of emotionally toned responses show a relationship to increased chronological age similar to that of commands in Fisher's study. A significant sex difference was found consistently at six of the seven age levels in Fisher's study, in that there was a larger proportion of remarks about objects among the boys than among girls. At the highest age level, the percentage was found to be the same for sexes. Girls tended to show more questions in the sum total of their remarks than did boys; they tended to give more commands. Fisher concludes:

Revealed through his language patterns, the preschool child is a confirmed egotist, and extremely sociable. He satisfies both needs by talking incessantly to other people, telling them whatever he happens to be doing at the moment. Gradually, as he grows older, he talks more and more about other people, but not at the price of leaving himself out of the picture . . . The outstanding feature of the language of the preschool child is the amazing constancy of the coefficient of egocentricity (p. 87).

3. *Analytical Studies Since Piaget*

Mention has already been made of the fact that vocabulary studies and grammatical analyses of children's speech have become plentiful recently. Some of these studies have presented much factual material in order to justify their basic theoretical considerations. Thus, Markey (21) contended that a large proportion of nouns in

TABLE 1
COMPARATIVE CHARTS OF THE INVESTIGATION OF PIAGET, MCCARTHY, AND FISHER

Author date	Subjects	Language sample	Major findings	Remarks
Piaget 1926	2 boys, Pie and Lev, age 6½ at <i>Maison des Petits</i> , Geneva. 20 additional children, ages 4 to 7	Everything said by each child during one month in morning class. 1500 additional remarks.	Coefficient of ego-centrism of .47 and .43 for Pie and Lev. Coefficient of .45 for added sample.	Pioneer study in the functional analysis of children's language. Paved way for wider application of his method. Chief criticism, the subjectivity of his findings. Language sample considered inadequate.
McCarthy 1930	Random sampling of 140 children the preschool population of Minneapolis, 18 to 54 mos.	Fifty consecutive verbal responses, secured during home visits, in a carefully standardized situation.	Only from 3 to 6% ego-centric responses found according to a classification modified from Piaget. Language development rapid in short time of 3 years.	Sampling technique excellent. Language situation too restricted for direct comparison with Piaget. Data with regard to construction analysis and grammatical development are more substantial than functional findings.
Fisher 1934	Seventy-two children in a homogenous group, aged 22 to 60 mos. Drawn from Child Development Institute, New York. High IQ and socio-economic status.	Large samples for each child in standard situations. Each child observed for 9 hours.	Remarkable agreement Piaget's findings on ego-centrism, using own classification system. Amazing constancy of the coefficient of egocentrism in the language of the preschool child.	Objectivity enhanced by the classification used. Applications limited because of individual records of each child's language. Influence of free play not eliminated, however.

children's language as well as several other parts of speech are used to indicate action (cf. Lewis [18]). Zyve (43) studied third grade children, recording their conversation daily in story periods of 15 minutes duration. Her results were tabulated in accordance with the number of different words used and the frequency of the various parts of speech. Thus, with respect to parts of speech, nouns constituted more than 50 per cent; they were only 15 per cent of the total number of words used. Such findings are significant only with respect to the theory entertained by some, that children exhibit a general tendency to build up more ideas about things than about acts, and that their world is more a *thing* world than an *action* world.

Of considerable significance, however, are the analytical findings of McCarthy and Fisher, whose functional analyses have already been outlined (Table 1). The former was interested in extending the previous investigations into the extent of vocabularies, and concerned herself also with the length and pattern of sentences. McCarthy's data showed a consistent increase with advance in age for the mean length of response, with the most rapid increase between 18 and 42 months, and with a much slower increase after that age. It would thus seem likely that sentence length as a measure of sentence development has little significance after four and one-half years. McCarthy found slight sex differences in favor of the girls. This may indicate that girls go through the developmental sequence sooner than boys. What if any is the influence of the association with older children upon the language of the child? McCarthy found that children who associated with adults had a decided advantage over those who associated with children of their own age. Bilingualism did not seem to be a serious handicap in language development as measured by the mean length of response.

Grammatical structure and the degree of grammatical complexity were also studied by McCarthy. In this analysis, adult conversational usage was the criterion of completeness of sentence structure. It was found that incomplete sentences decreased with advance in chronological age, and that at nearly all ages, omission of the verb proved to be the most frequent type of omission. This was especially so in the lower age groups. When verbs and other parts of speech come into the vocabulary, omission of the subject is

a more frequent type of error. The percentage of compound, complex, and elaborated sentences was found to increase with age. Girls showed a clear superiority over the boys in all of these developmental tendencies. Many observers may comment upon these findings, pointing out that they may be easily inferred by common sense. But this is not a serious complaint; the quantitative investigation of common sense opinions is indispensable to the progress of science. No one of course assumes that such investigation, however, stops just there.

With respect to word analysis, McCarthy's study is superior to any that preceded hers, in methodology, sampling of subjects for normative data, and size of samples. Her findings were similar to those of Smith (37); to wit, a marked increase in the use of words with age, starting with 20.3 words at 18 months and increasing to 230.5 words at 54 months. As pointed out before girls exceed boys in the mean use of words at lower age levels. The mean number of different words used (extent of vocabulary) also increases with age. McCarthy finds her data to be in agreement with a theory advanced by Jespersen (15) to the effect that some language originates in children by their echoing the meaningless sounds of others. In concluding her study, she emphasized the rapidity with which the complex habits involved in learning to speak are acquired by the child. Thus, by the age of four and one-half, the child is a "highly social individual, using language for his every need and desire, not only physical, but intellectual, and in addition he is using all the most complex forms of sentences found in adult conversation, and his vocabulary amounts to several thousand words" (p. 149).

Fisher's study (10) is based upon the hypothesis that during the preschool years the child gives a "vivid picture of himself through his language, and that his spoken language gives fundamental cues to his personality" (p. ix). She did not consider the extent of children's vocabularies nor the proportionate increase in the number of different kinds of words. Instead, data were assembled which revealed the proportions of speech which tend to be non-verbal, exact repetition, and the extent of complete or incomplete sentences at the different age levels. Fisher found a Pearson r of $-.42 \pm .07$ between the per cent of non-verbal speech in the sum total of re-

marks and chronological age. The decrease is definite and steady from the 18 to 23 months old group through the 36 to 41 months old group. Even the older children find need for non-verbal expression. Incomplete sentences decrease rapidly from one and a half years to three and a half years. Again, it was found that the omission of the verb or some essential part of the verbal combination was the most frequent type of omission. With respect to complete sentences, there is a rapid rise from the 18th to about the 38th month, following which there is a tendency for stabilization. "It may well be that these superior nursery school children by the middle of the fourth year have already mastered the patterns of ellipsis common to adult conversation" (p. 48). From a developmental point of view, simple sentences appear first, followed by compound sentences by the age of 24 months. As one should expect, Fisher found a high correlation between the use of complex sentences and intelligence, with an r equal to .84-.92. The amount of exact repetition is negatively correlated with age. This brings to mind Piaget's contention that repetition in children's language is carried on because the child enjoys repeating words for their own sake.

In Fisher's study too it was found that girls tended to develop more rapidly than boys as far as control of grammatical structure is concerned. Girls use more complete sentences in five of the seven age groups, while boys use more incomplete sentences in six of the seven age groups. Boys tend to use more non-verbal speech patterns throughout the preschool years than do girls. They tend to repeat identical speech patterns, too, more often than girls.

A good index of social significance was revealed in the study of the use of *we*, *our*, and *us*. No child used any of these pronouns until the first half of the third year, although they were using the first personal pronoun in the singular before then. There is no significant relationship between the use of these pronouns and intelligence (IQ). "If we knew why some children very definitely adopted these formulas—often for their own needs—while others remained comparatively impervious, we should be in possession of data of extraordinary interest" (p. 74).

4. *Summary of the Psychological Studies of Play*

As a background to the study of language as it relates to play, emphasis is placed in this summary on the influence of play situations on the behavior of children. Such an approach ties in more intimately with the paramount interest of this investigation than would a more generalized review. For such a review, see the paper on the social psychology of human play by Britt and Janus (5).

As in the case of the experimental study of the language of children, so with respect to the investigation of play, the nursery school movement here and abroad has stimulated research in many directions. More empirical studies of play have been published in the last two decades than in all the preceding ones taken as a whole. Like language, too, observers have discerned in the play behavior of children the significant element of periodicity, i.e., variations in behavior throughout the different stages of development. The evidence bearing upon this aspect of play in children has been ably reviewed by Hurlock (14).

From the point of view of the functional analysis of language, it is noteworthy that early investigators of play found considerable interest displayed by children in dramatic and physically active play, as well as in functional games. In their play, children are impelled to ascribe a name or meaning to their activities. It is perhaps pertinent to ask if there is any connection between the relative superiority of girls over boys in developmental aspects of language and the preference of boys as compared to girls for mastery of the technical, inanimate world, as evidenced in their play. Moreover, the fact that children, seemingly, rarely put themselves in the place of their hearers may be related to their facility, commonly noted by observers, in getting along when left to their own devices. At such times, collective monologue is quite suited to their activities, more, so it would seem, than any other form of talk. The appearance of sentences, and the increase in length of these with advanced age is quite natural in view of the fact that the span of attention in children as, for example, the holding power of play materials, increases in a similar manner, so that children can carry on play relations of a progressively increasing and more sustained duration as they advance in age. Greater language facility has been found by some to be closely associated with more imaginative play, and more

group play has been observed in three-year-olds as compared with two-year-olds. Speech is usually found to accompany physical, manipulative, and imaginative play, and appears less frequently in constructive play. If, as has been found, dramatic play stimulates social activity, whereas playing in the sand evokes quarrels among children, there is good reason to examine the influence of these forms of play on language.

The concept of continuous development in play, wherein certain definable stages may be distinguished, is, as has been shown equally tenable in language study. Growing out of these stages may be discerned an index of social participation in play which some observers have found to be fairly constant at the age level of seven and one-half to nineteen and one-half years. Can any parallel be drawn between this finding and that of the predominance of egocentric talk in children under seven? The data resulting from this study may shed light upon this, and similar questions.

Among others, the following situations arising out of play have been summarized by Britt and Janus (5): Striving for leadership, struggle for dominance as opposed to submissiveness, desire for sympathy, coöperation, conflict, attempts to influence the behavior of others, struggle for prestige and recognition, problem solving behavior, frustration and the like. The remarkable effects of a frustrating situation on the behavior of children at play lead one to speculate upon the effects of such circumstances on their language. In a cleverly executed experiment wherein the children were denied the use of newly presented toys which they had enjoyed previously, and which, though unobtainable, were visible through a one-way screen, such "frustration" effects as regression in the constructiveness of play were noted, in addition to social and physical attempts to overcome the barrier.

It is significant that Piaget, in seeking the solution of the problems of child morality, approached his subjects through the medium of play out of which the language responses in carefully standardized situations were elaborated (33). In analyzing the application of rules to play, he found the stage of egocentrism, in the hierarchy of child jurisprudence, quite prominent in the age period of two to five years. The extent to which play and language are contiguous in the work of Piaget needs no further comment here. From

a practical point of view, clinicians (cf. 5) have seized upon these overlapping factors of play and language and have gained much sought-after insight into the problems of child behavior.

C. PROCEDURE

1. *Collection of the Data*

a. Selection of the subjects. While previous investigators have limited their observations to preschool children in one locality, the attempt has been made in this study to reach the preschool population in a number of widely scattered geographical locations. Thus, while the present observations have been restricted to the nursery school environment for reasons of (a) standardization, and (b) the ready duplication of subjects and materials, the wide geographical sampling was quite sufficient to bring out any individual and group differences in the language usage and development of the subjects. Accordingly, subjects were observed in attendance at the following nursery schools at different periods from November, 1939, to February, 1941:

I. National Child Research Center, Washington, D. C. "Founded in 1928 as the Washington Child Research Center under a grant from the Laura Spelman Rockefeller Fund, the center was cooperatively sponsored at its start by the American Home Economics Association, the Bureau of Home Economics of the United States Department of Agriculture, the American Association of University Women, the George Washington University, the University of Maryland, the United States Office of Education, and the United States Public Health Service."¹

II. Euclid Nursery School, Washington, D. C. A private school for parents in low-income brackets including the clerical and skilled occupational classes. Many children come from broken homes.

III. L. C. Block Nursery School, Dallas, Texas. Situated in a cottage behind a cotton mill, this school is sponsored by the Dallas Community Chest. Parents predominantly of the unskilled labor class, e.g., mill hands, waiters, and the like, are represented.

IV. W. P. A. Nursery School, Dallas Texas. Accepts children of parents in the unskilled labor class.

¹As described in one of the school publications.

V. West Dallas Kindergarten, Dallas, Texas. Accepts children of parents in the unskilled labor class.

VI. M. K. Drew Nursery School, Dallas, Texas. For children of professionally occupied parents.

VII. Amelia Huvelle Day Nursery, Dallas, Texas. For children with parentage in the unskilled labor class.

VIII. Incarnate Word Nursery School, San Antonio, Texas.

IX. Alamo Heights Kindergarten, San Antonio, Texas.

X. School of Childhood, San Antonio, Texas. These three schools are for children of parents in professional employment.

XI. Oak Lane Country Day School, Philadelphia, Pennsylvania. Founded in 1916, and acquired by Temple University in 1931, since when it has functioned as a laboratory school. It is a unit of the University, and is directly related to the Teachers College.

XII. Nursery School, Teachers College, Temple University. Founded in 1929 as a teacher-training project, maintained under the guidance of the University's Teachers College.

The distribution of the subjects with respect to age, sex, occupational status of parents, and geographical location are summarized in Table 2.

From Table 2 it will be seen that a total of 290 preschool children in attendance at nursery schools in the east, midwest, and south were observed. These subjects ranged in age from 18 to 72 months at the time of observation, and represented the four major occupation classes with respect to their parentage.

b. Methods of observation and recording of the data. Arrangements were completed with the school authorities concerned, for observing the subjects in the course of the daily nursery school routine before any data were recorded. There followed a brief period ranging from two to three days during which the observer visited the school, passing among the children in an endeavor to establish the necessary rapport. Only when the observer noted no untoward reactions on the part of the children were observations recorded. In a number of schools serving as models for the local university, the children were accustomed to the presence of strangers and took such visitors for granted. It may be noted, in passing, that the children observed in the course of this investigation quite readily adjusted to the presence of the observer in almost all cases. There were occasional queries addressed to the observer of teacher-in-

TABLE 2
DISTRIBUTION OF THE 290 SUBJECTS

School numbered as above	Geographical location	Number and sex	Age range	Occupational status of parents
I	Washington, D. C.	15 M 6 F	18 to 36 mos.	*Professional Managerial
		12 M 12 F	36 to 54 mos.	
		5 M 2 F	54 to 66 mos.	
II	Washington, D. C.	24 M 20 F	24 to 60 mos.	Clerical Skilled
III	Dallas, Teaxs	10 M 10 F	36 to 72 mos.	Skilled Unskilled
IV	Dallas, Texas	10 M 5 F	36 to 48 mos.	Unskilled
V	Dallas, Texas	10 M 11 F	36 to 60 mos.	Unskilled
VI	Dallas, Texas	9 M 12 F	36 to 60 mos.	Professional Managerial
VII	Dallas, Texas	12 M 9 F	36 to 60 mos.	Unskilled
VIII	San Antonio, Texas	9 M 17 F	28 to 50 mos.	Professional Managerial
IX	San Antonio, Texas	13 M 7 F	48 to 60 mos.	Professional Managerial
X	San Antonio, Texas	9 M 13 F	24 to 66 mos.	Professional Managerial
XI	Philadelphia, Pennsylvania	10 M 8 F	50 to 72 mos.	Professional Managerial
XII	Philadelphia Pennsylvania	4 M 6 F	24 to 48 mos.	Professional Managerial

*Predominantly in governmental agencies and departments.

charge relative to the *raison d'être* of the visitor. Some children curiously inquired as to what the "witing" was all about. More often than not, the observer was totally ignored, while the preoccupied subjects went about their business.

In order that the language records be taken in as uniform a manner as possible, the gathering of the observations was restricted to the writer and one other person trained in the recording of the data so as to conform to the methodology described below. Frequent conferences were arranged wherein actual language records were reviewed, and their discrepancies discussed. Occasionally, both observers attended the same activity taking notes simultaneously. These records, taken in longhand, were compared and their differences noted. On this basis, the following rules were set down as a guide to conducting the observations throughout the investigation:

1. Record a remark as a single, independent utterance which is spoken by one child in one continuous sequence.
2. Remarks which are interrupted or otherwise broken off are to be recorded as independent utterances even though spoken by one individual.

Thus, the criterion of a remark which was recorded and subsequently tabulated as an independent entity was that it be spoken by one child in one unbroken sequence, without regard to the number of separate sentences spoken, from a grammatical standpoint.

3. Record each independent utterance verbatim as heard, with incoherent words supplied as dashes.

4. Indicate the normal inflections of voice by use of the question mark, exclamation point, and period.

5. Avoid the use of exclusively phonetic spelling, without obscuring the peculiar characteristics, if any, of the subject's enunciation and slurs in speech. (This was of paramount significance in recording children's language in the southern communities.)

6. Record the remarks of as many different speakers as possible engaged in one activity in the spoken order as heard.

7. Note all remarks, even though they vary from one word to many sentences.

8. In conversation between pairs of children, record each speaker's utterance independently which is set off from the other's remarks by a pause or incoherent babbling.

9. In conversations between two individuals, record each independent remark in the exact order as spoken without regard to logical sequence or arrangement.

10. Where songs, or poetry are quoted, record the lines as recited verbatim.

Wherever possible, the observer consulted the schedule of activities arranged by the school management so as to compile a schedule of visits, in turn, which would enable the sampling of as wide a variety of play activities as was possible. When such materials were not available, the necessary information was obtained from the proper authorities in order to avoid duplication of visits on the same activity-days and unnecessary visits to the school. Such planned visits arranged well in advance made possible the study of two or more samples in the same city.

In almost all cases, the observer's entrance upon the activity in progress was practically ignored, after once having established *rapport* among the children. Very little attention, if any, was paid to his taking of notes. Remarks were recorded so long as the activity under observation was uninterrupted. To facilitate carrying out the procedure described above, a standardized Language Record was constructed to be used as described below.

2. *The Language Record*

a. Assembling of the language data. On the basis of preliminary observations, it was decided to record certain data for each separate group studied, with a view to the ultimate comparability of the language sample. Obviously, a listing of the circumstances under which the language data were recorded would facilitate the teasing out of comparable records for study with respect to specific factors as desired. Accordingly, the following standard data were assembled in the form of a Language Record (Figure 1) upon which the necessary notes were preserved:

- I. *Data with Respect to the Play Activity Being Observed.*
 - A. The name of the activity in accordance with the nursery school nomenclature, e.g., clay modeling, free play, story hour, music appreciation, coloring, etc.
 - B. The materials employed by the children, e.g., blocks, sands, paints, clay, paper strips, etc.
 - C. Environment of the activity, whether indoor or outdoor.
 - D. Time of occurrence of the activity, whether morning or afternoon.
 - E. Duration of the observation in minutes (usually determined by the duration of the activity)
- II. *Data with Respect to the Subjects*
 - A. The IQ range

- B. The chronological age range of the group observed in months.
- C. Sex and number of the children under observation.
- D. Occupational status of the parentage classified as:
 - 1. Professional and managerial,
 - 2. Clerical,
 - 3. Skilled,
 - 4. Unskilled.

These classes of occupation were broadly construed, inasmuch as, for the purpose of this study, no strict technical usage was warranted.

- E. The play-group status of the children, as to play in groups, pairs, etc.

III. Miscellaneous Data

- A. Name of the school
- B. City in which it is located.
- C. Date of the observation
- D. Name of the observer

The format of the Language Record provided for the recording of the language responses observed under the conditions noted with space provided for coding the independent utterances as described below (see Coding System). When completely filled out, the Language Record included the factual data obtained as outlined above from school records or from interviews with school management; the language responses for a given sample; the codes determined for, and assigned to each utterance; and the analysis for the individual Record which will be discussed in detail under *Treatment of the Data*.

3. Determination of the Play Variables

a. *Selection of non-overlapping factors in play.* Pursuant to the major purpose of this study, i.e., the investigation of children's language as related to their play activities, two main axes were set up against which the assembled data were to be related. The first axis was the language functions discussed in the next section. The second axis was constructed to reflect the different play situations.

This second axis—the play variables—occasioned considerable difficulty. The play activities in which children engage may not readily be set off from one another by any rigid lines of demarca-

tion. Thus, the mere assignment of different names to a variety of activities does not obliterate such overlapping factors as spontaneity, lack of concern for the outcome, display of initiative, and complete self-absorption found almost universally in all play activities. For this reason, the problem of finding play variables which could elicit the agreement from critics as to their being quite distinct from one another proved to be perplexing. Obviously, in seeking after the influences of play upon the language of children, such distinct factors would have to be isolated. Parten (29, 30, 31) proposed such categories of play as:

"Unoccupied behavior"—The child apparently is not playing, but occupies himself with watching anything that happens to be of momentary interest."

"Onlooker"—The child spends most of his time watching the other children play . . . does not overtly enter into the play himself."

"Solitary play"—where the child centers his interest upon his own play, making no effort to get close to and speak to other children . . . pursues his own activity without reference to what others are doing."

"Parallel activity"—The child plays independently . . . , beside rather than with the other children" (30, p. 250).

It will be apparent that these categories are not suited to the present study inasmuch as they are subject to considerable interpretation on the part of the observer—a condition which we sought to avoid—and because they are primarily concerned with the *individual's* degree of social participation. More appropriate to this study are Parten's types of group play described as follows:

Associative play—The child plays with other children. The conversation concerns the common activity. All the members engage in similar if not identical activity, . . . each child acts as he wishes. By his conversation with the other children one can tell that his interest is primarily in his associations, not in his activity.

Coöperative or organized supplementary play—The child plays in a group that is organized for the purpose of making some material product, or of striving to obtain some competitive goal, or of dramatizing situations of adult and group life, or of playing formal games (p. 251).

While these groupings are excellent as far as they go, their ap-

plication would restrict the number of play variables available for such a study as this. For the benefit of language study, broader categories than those outlined above must be employed. Thus, the following aspects of play have been selected to constitute the variable for one of the major axes of this study, since they approximate as closely as possible the fulfillment of the criteria emphasized, i.e., (a) that they do not overlap, (b) lend themselves to a study of children's language, and (c) permit of a sufficient variety of group activity to which the language may be related.

I. *Active, indoor play, heterosexual.* Children of both sexes, numbering three or more, joined in a common sustained activity, or playing in each other's presence, manipulating toys or materials, maintaining the group structure with a dominant and directed leadership, or without subordinating their interests to those of any leaders, and conversing with one another in a direct exchange of communication or by common voluntary consent. Conversation centers about the activity in progress, the playmates, requests for materials, commands, threats and the like.

II. *Active, indoor play, unisexual.* Children of one sex playing as above (I). Justification for setting up this aspect of play as a separate and independent variable lies in the definite influence of sex on the language of children as reported in the historical survey above.

III. *Active, outdoor play, heterosexual.* Children playing as in (I) above, with a broader canvass, so to speak, for their play milieu. Moreover, besides the difference in environment in this variable from that of (I), this type of play more nearly approaches a situation analogous to that of children playing in neighborhood, or near-home environments.

IV. *Active, outdoor play, unisexual.* Children of the same sex playing as in (III) above. The last two variables obviously involve gross, bodily movements such as running, skipping, jumping, and climbing, and the use of outdoor equipment, e.g., jungle-gym, sliding pond, etc.

V. *Passive play.* The subjects are indifferent bystanders, onlookers, or listeners, or sometimes evince interest in attending some activity, as story hour, without ever entering overtly into the activity themselves. Examples include listening to records for music appreciation, watching the Christmas tree decoration in progress, attending a playlet and the like.

VI. *Play in pairs.* Two children of like or opposite sex engaged in a sustained, joint activity, either indoors or out-

of-doors, sharing the toys or materials, directly cooperating with each other, and centering their conversation about their common interest, requesting each other's help, directing each other's actions, and the like.

It may be argued that these variables listed above relate to clusters of play activities rather than to any specific play behavior. This criticism is just; but it hardly invalidates the use of such variables for the investigation of children's language. It must be pointed out that any attempt to study children's language as a function of their *games*, or *specific play activities* would complicate and bcloud the issue with variables almost *ad infinitum*. For the sake of simplicity alone this state of affairs must be avoided. What is of more significant bearing upon this point is that most, if not all, attempts at specificity in delimiting children's play suffers from sins of omission (see 5). Play cannot readily be limited to a specific kind of activity, or to any specific kind of goal-seeking behavior. Play would appear to constitute an *attitude* of behavior rather than a *class* or *type* of behavior; and it is the influence of this attitude—elusive as it may be—upon the language of children with which the present investigation is concerned.

Actual observation confirmed the amenability of these variables to a treatment whereby the language responses of the subjects could be related to a number of non-overlapping play factors significantly. These relationships will be discussed in the results of this investigation.

4. *Determination of the Language Variables*

In view of the criticism leveled at Piaget's classification of language function by some American investigators, language variables were selected for this study which would not be subject to variations in interpretation and which could stand the test of objective observation. Moreover, these variables or functions are defined in terms closely akin to the natural situations in which they are most frequently used by children. These aims, more than any predilection for originality, have dictated the formulation of the language usages outlined below. They shall be termed *Code A* in all future references to them. The categories described were constructed on the basis of over one thousand independent utterances

of children of various ages participating in a variety of activities. They represent all possible usages of language which the writer could determine on the basis of his observations. They permit of significant differentiation in children's use of language. Their comparability with the classification of Piaget may be deemed an added advantage, since any attempt to overlook previous contributions leaves no assurance that the present contribution will fare any better.

In addition to the categories of language function formulated for this study, a supplementary system of classification of language usage employed by Henle and Hubbell (13) in a study of adult language has been borrowed for purposes of comparison, as well as to determine its applicability to children's language. This will be called *Code B*.

The contribution of Henle and Hubbell is particularly significant in its application to this study for it serves to test the implication of some previous studies that as the child grows older his speech becomes more socialized, and that in the adult ego-related speech appears less frequently than in the child. In this regard, these authors felt that Fisher's classification of sentences (16) as ego-related if the self is subject and as social if another person is subject was not a "valid index of the hypothesized decreasing 'egocentricity' of language" (13, p. 229). Their classification, therefore, attempts to assign a sentence to a particular category on the basis of its *meaning* rather than any literal grammatical criterion. This emphasis upon *meaning* makes *Code B* an invaluable supplement to *Code A* where the emphasis is upon function.

5. *Definition of the Language Functions: Code A*

1. *Social Manipulation.* Direct attempt by the speaker to evoke a response in the hearer. This category includes commands, threats, petitions, challenges, cries of help, begging favors, seeking and granting permission, and the like.
2. *Reasoning.* Reference to cause and effect, or to the "why" of an event, relationship or phenomenon, etc. The use of "because" and "since" are not necessarily to be construed as indicative of logical sequence or reasoning.
3. *Non-Directed Discourse.* Language is directed to none in

particular, but is merely a vocal accompaniment of the speaker's behavior. The speaker thinks aloud with no concern as to whether or not his remarks are heard or accepted. (This category is identical with that of Piaget's for *egocentric* speech.)

4. *Criticism*. Expression of approbation, disapproval, pertinent comment, and complaint. These may refer to persons, or objects, or both, either present or absent.

5. *Imparting Information*. Answers to questions or commands, and statements of fact *addressed to a hearer*. While not necessarily elicited from the speaker by another person, it is always directed at a hearer or hearers.

6. *Inquiry*. Includes questioning, seeking advice from someone, and curious or aimless interrogation directed at a person or at a number of persons in the environment. Rhetorical questions are not included.

7. *Argumentation*. Involves conflict, cross-purposes, and incompatibility of desires, behavior, etc. At least two speakers are necessarily involved.

8. *Imaginative Discourse*. Concerns make-believe incidents and "tall tales" conceived by the speaker, or repeated by him in the course of his conversation. May involve a stream of language with a mental theme. Differs from Category No. 5 in that there is no real basis for the language in the immediate environment. The events are imagined, not perceived.

9. *Incoherent Verbalizing*. Disconnected words and phrases, jibberish, babblings and mutterings which are an end in themselves and appear quite automatically in the course of the speaker's activity.

10. *Expletive*. Includes such utterances as "yes," "no," and the like not classifiable in any of the preceding categories.

11. *Salutation*. Includes all social greetings not classifiable in any of the preceding categories.

6. *Definitions of Language Categories (Henle and Hubbell [13]): Code B*

The categories defined below are designed to characterize the sense or meaning of remarks and differ from those defined above which are directed at the function implied in the remark. Since an independent grammatical analysis is included in this investigation (*infra*), the definitions which follow are not to be construed as

relating to grammatical usage or structure. The codes *A* and *B* are treated here as co-related since the criteria of *function* and *meaning* are not mutually exclusive.

1. *Ego-Related Sentences*

- A. Ego-Related Statements.* Statements of the activities of the speaker, of his feelings and emotions, his ambitions, desires and interests.
- B. Opinions.* Statements of opinions, attitudes, preferences, criticisms, in short, all evaluative and normative statements. Whether or not the opinion relates to other persons or objects or to the speaker himself is not relevant for the purpose of the classification.

2. *Social Sentences*

- A. Social Statements.* Statements made about other people (whether about the hearer or a third person) and their activities.
- B. Social Questions.* Questions about other people and their activities.
- C. Social Forms.* Such stereotyped social phrases as "I thank you."

3. *Sentences Containing Mixed Reference*

- A. "We" Statements.* Statements about the joint activities of the speaker and another person, or about activities of the "we-group."
- B. Commands and Requests.* In such sentences the ego expresses itself, but the activity of another person is also essentially involved.

4. *Objective Sentences*

- A. Objective Statements.* Non-evaluative statements about objects and impersonal events.
- B. Objective Questions.* Questions about objects and impersonal events.

5. *Yes and No and Equivalent Phrases*

7. *Treatment of the Data*

a. Functional analysis, coding system A. As previously mentioned, columns were provided on the Language Record for the assignment of codes to the separate and independent utterances. With respect to the language variables designed specifically for this study, hereinafter designated as coding system *A*, codes were assigned in accordance with the listing of these variables above. Each utterance was read independently by two coders, and where any dis-

crepancy occurred in the assignment of a code, the utterances concerned were re-examined. Moreover, the reliability of this method of designation of the codes was investigated as described below. Other investigators, e.g., McCarthy (22) and Fisher (10), have employed the same technique with a significant degree of reliability reported in their studies. While both coders in this study have had considerable experience in actual observation in addition to having the context of each utterance before them, it was nevertheless found by actual trial that the language could be coded without reference to these empirical backgrounds. This finding was confirmed in checking upon the reliability of the coding methodology.

b. Functional analysis, coding system B. The categories borrowed from the work of Henle and Hubbell (13) hereinafter designated as coding system *B* were treated as above (coding system *A*). To each independent utterance, a code was assigned in accordance with the listing above, thus designating the main category and subcategory in which it belonged. Because this classification was primarily designed for adult conversation, it was found necessary to exercise discretion now and then in determining the category to which certain of the language response occasioning some doubt belonged. Where none of the categories listed could be assigned, the utterance was designated as *NC*, non-classified. The reliability for the method of selection of codes in this classification was similarly studied, as described below.

c. Grammatical Analysis. This analysis, called by some investigators structural analysis, may be considered here with respect to sentence length type; of sentence; and use of personal pronouns, non-verbalisms, repetitions, and incomplete sentences.

(1). In the analysis of sentence length, an aspect of children's language to which previous investigators have devoted considerable attention, particularly as it varies with age, the following procedure was carried out: For each independent utterance, the separate and distinct words uttered were taken as indicative of the sentence length. This number was noted in the appropriate column on the Language Record. Incoherent words were not counted. Repetition of the same word in the same response counted only the first time it appeared in that response. Words usually independently pronounced but contracted by the subject, were counted as one

word. Words broken off in the middle were counted as if completely uttered. Similar treatment was accorded to words incompletely or inadequately pronounced. Thus, all recognizable words, separately uttered, were so counted.

(2). The three major types of sentence were employed in this aspect of grammatical analysis, to wit: declarative, interrogative, and imperative. No departure was made from the accepted definitions of these types in coding the responses. Incomplete sentences, or remarks of doubtful classification were designated *NC*, non-classifiable. Where responses were compound of two or more types of sentence, the last type in each case was arbitrarily chosen to represent the entire response. As mentioned previously, in describing the method of recording the language data, appropriate punctuation was supplied by the observers throughout the study. Thus, all sentences ending in a question mark were designated as interrogative, regardless of their having been coded as inquiry with respect to the functional language variables or not. Similarly, sentences containing a command and punctuated with an exclamation point were designated as imperative. Thus, codes were independently assigned under this heading without regard to the treatment of the responses relative to their language function.

(3). Utterances were coded as non-verbalisms wherever the verb was necessary for the sense of the sentence but omitted. This was determined by raising the question as to whether or not the verb was necessary to complete or clarify the sense of the remark. Thus, "non-verbalism" refers to a sentence ordinarily spoken with the verb, but which is now lacking that verb.

Those responses were designated as including the use of personal pronouns where such pronouns as *I, we, us, they, he, she, me, etc.*, were present.

Repetitions were taken to constitute those remarks recited verbatim following the remark of a previous speaker.

Incomplete sentences were construed as those lacking some essential element other than the verb, necessary to complete the sense of the sentence.

Because of the relative objectivity of this *genre* of analysis, further elucidation need not be offered. Considerable importance has been

d. *Summarizing the data.* The number and letter codes designated in the vertical columns of the Language Record were summarized and tabulated for each record as shown on the bottom of the standard form employed (Figure 1). Thus, the frequency (f)

School..... City..... Date.....
Play Activity..... Materials.....

Indoor ()
Outdoor () L A N G U A G E R E C O R D Solitary { }
A.M.() P.M.() Pair { }
Observed for mins. Group { }
 M.. F.,

Iq range.....to.... Age range.....to....mos. Occup.P&M.C.S.U..
Observer.....

A B x y

ANALYSTS

P.V.....	1A...		
	1B...		
	2A...		
L.V.	2B...		M.S.U.....
	2C...		
1... 4... 7... 10...	3A...	TOTAL...	F(d)... F(1m)... F(1n)...
2... 5... 8... 11...	3B...		NV... R... PP.....
3... 6... 9... NC...	4A...		Inc... NC.....
	4B...		
	5...		

FIGURE 1

of occurrence of the various language variables (*L.V.*) and the frequency of occurrence of the various types of sentence, i.e., declarative (*d*), imperative (*im*), and interrogative (*in*), were tabulated sepa-

rately for each record. In addition, at the bottom of each record were noted such additional data as:

1. Total independent utterances.
2. Number of non-verbalisms (*NI*).
3. Number of repetitions (*R*).
4. Frequency of use of personal pronouns (*PP*).
5. Number of incomplete sentences (*Inc.*).
6. Frequency of sentences not classifiable as declarative, imperative, or interrogative (*NC*).
7. The mean sentence length (*M.S.L.*).
8. The play variable for that record (*P.V.*).

From the tabulated summaries of each individual record, data were assembled on cross-lined master sheets so arranged as to present the two major axes of the study, play variables and language functions (including both code systems) as the *x* and *y* axis, respectively. Under each of the *x* variables, the minor variables of age and geographical location were included, in subdivisions of the variables. Columns were arranged, in addition, whereby the data concerning the grammatical analysis for each of the major *x* variables could be exhibited. All entries were made upon the master sheets in percentage form. Thus, for any play variables, with respect to one age group, and for a given geographical location, the percentage of the remarks falling within a specific language function was noted in the appropriate box as a fraction, i.e., the number of language responses coded for a specific language function over the total number of independent utterances recorded on one specific Language Record. This procedure was adopted after a number of alternative plans were considered, because it lends itself most aptly to a discussion of the interplay of the variables (see *Results*). This procedure in assembling the data afforded one other, equally significant advantage. As pointed out in the statement of the major purposes of this investigation, one of the aims uppermost in the mind of the writer has been to examine Piaget's contention as to the egocentricity in children's speech. Thus, an analysis of the assembled data reading along the vertical columns readily permits of the determination of the *coefficient of egocentricity* within any specified age group, and for a given play variable. The possibilities for further comparisons among these data are manifold,

as must seem apparent to the reader. Finally, comparisons between the findings reported below and those of previous investigators were rendered more feasible by this arrangement in summarizing the data.

D. RELIABILITY AND DATA ANALYSIS

1. *Reliability of the Method of Coding*

Previous investigators have examined the reliability of the subjective classification of language, because of the dependence upon the observer's judgment inevitable in such a procedure. While the analysis of language in respect to grammatical structure is reasonably objective, the assigning of codes to designate the functional intent of an utterance depends upon the rater's interpretation to some degree. This degree of individual variation among different raters is measurable; and it was found to be consistently low by previous workers in the field. Piaget (32) called attention to the significance of a functional classification of children's language that could elicit a fair degree of agreement among various observers familiar with the criteria of the particular classification, and pointed out that four people engaged in classifying his material were found to coincide within two or three per cent.

Thus a measure of the reliability of the technique employed here in coding the remarks assembled in accordance with both *Code A* and *Code B* was obtained as follows. Two hundred remarks selected at random from the coded Language Records scattered among the 12 different samples were administered to three doctorate students in psychology, with instructions to familiarize themselves with the codes *A* and *B*, and then to code the remarks accordingly.

The codes assigned by the three independent raters were compared with those recorded upon the Language Records. Taking each code system separately, it was found that for *Code A* the percentage disagreement between the original codes and experimental codes assigned by Raters *A*, *B*, and *C*, respectively, was .07, .06, and .07. For *Code B* these percentages were .03, .085, and .05. That is, the remarks coded by Rater *A* showed disagreement with the codes assigned by the investigator to the extent of 7 per cent and 3 per cent for *Code A* and *Code B*, respectively. Similarly,

Rater *B*'s code designations were at variance with the investigator's by 6 and 9 per cent for the two code systems respectively. Rater *C*'s disagreements may be interrupted in the same way. There is thus somewhat more agreement between the original and experimental codes for the system devised by Heule and Hubbell (13) whose categories are broader than those devised for this study. In general, these findings are borne out by those reported in previous investigations. The agreement between Raters *A*, *B*, and *C* and those of this investigation seems quite reliable.

E. THE RESULTS OF THE ANALYSES OF CHILDREN'S LANGUAGE: DISCUSSION OF THE FINDINGS

1. *The Functional Analysis of Children's Language: The Analysis of Children's Language by Code A*

a. Play as a factor in children's language. The dominant aim of this investigation was to study the influences of free play upon the language usage of children. Certain deficiencies were inherent in previous investigations by reason of their neglect of this proper frame-of-reference for language, and emphasis has been placed here upon the concept of language as an instrumentality of social or *shared* behavior. This investigation has proceeded upon the premise that out of social behavior arise situations indispensable to the study of language. Observers have frequently been struck by the parallel motives reflected in both the play and language of children.

Given the human organism with its capacity for producing articulate sounds, given the mechanisms of the reflex circle and the conditioned response which explain the acquisition of language responses, there is still a third factor responsible for language development—its motivational source. This factor has been neglected by many students of language. It refers to the instrumental function of language in social adaptation, cooperation, and control (16, p. 362).

b. The influence of play variables on language usage. The language responses recorded on the separate Language Records were transferred to a master data sheet classified according to the function of the utterance, the play situation in which it was uttered, the age of the speaker, and such other pertinent factors as described in the *Procedure*. These data have been summarized in Table 3

TABLE 3
THE DISTRIBUTION OF LANGUAGE FUNCTIONS ACCORDING TO CODE A: THE PERCENTAGE OF LANGUAGE EMPLOYED FOR EACH LANGUAGE FUNCTION BY 290 CHILDREN OF JUNIOR (J), SENIOR (S), AND KINDERGARTEN (K), AGES, IN SIX DIFFERENT PLAY SITUATIONS

Language function	Play variables											
	Active-indoor						Active-outdoor					
	I			II			III			IV		
	Heterosexual	Unisexual	J S K	Heterosexual	Unisexual	J S K	Heterosexual	Unisexual	J S K	Passive	V	VI
	J S K	J S K	J S K	J S K	J S K	J S K	J S K	J S K	J S K	J S K	J S K	J S K
1. Social manipulation	.24.20.23	.16.21.26	.42.29.27	.17.34.43	.18.23.07	.34.24.33	.25.25.27					
2. Reasoning	.00.00.00	.00.01.00	.00.00.00	.00.01.00	.00.02.02	.00.01.00	.00.01.00					
3. Non-directed discourse	.02.03.03	.00.05.10	.00.06.02	.22.03.01	.18.02.02	.09.06.01	.15.04.02					
4. Criticism	.06.11.13	.04.12.20	.00.06.15	.03.08.03	.01.03.13	.00.06.17	.02.07.18					
5. Imparting information	.33.34.34	.30.38.27	.32.29.29	.40.20.21	.29.46.46	.26.27.30	.32.32.31					
6. Inquiry	.11.17.17	.08.14.09	.10.15.14	.07.08.01	.13.18.15	.08.14.07	.09.14.11					
7. Argumentation	.01.04.00	.04.01.01	.00.03.03	.03.01.03	.01.03.01	.10.02.01	.03.02.02					
8. Imaginative discourse	.02.03.03	.00.05.10	.00.06.02	.00.07.20	.00.01.06	.01.06.03	.01.05.07					
9. Incoherent verbalizing	.04.01.02	.17.01.00	.00.05.03	.01.05.00	.09.02.00	.01.07.01	.05.04.01					
10. Expletive	.07.01.01	.02.01.02	.04.01.02	.05.07.06	.07.01.01	.05.05.04	.05.03.03					
11. Salutation	.01.01.02	.00.01.01	.00.01.02	.01.08.01	.00.00.01	.01.01.02	.01.01.01					

which gives the percentage distribution of language usages for the six play variables in accordance with *Code A*. For the junior age group (18 to 36 months), active, outdoor, heterosexual play seems to stimulate significantly more language calling for social manipulation than any one of the remaining play variables. Both for the senior (36 to 54 months) and kindergarten (54 to 66 months) age groups, active, outdoor, unisexual play appears to elicit more social manipulation on the part of the subjects than any of the other factors of play. It would thus seem that active, outdoor play is more conducive to language involving commands, threats, petitions, challenges, cries of help, and all direct attempts to evoke a response in others, than other forms of play. This finding is not remote from reasonable expectations. However, it is important to point out that the circumstances of play which promote the use of language for social manipulation thereby operate to reduce the transactional part of total language devoted to egocentric or non directed discourse. Moreover, it will be seen from Table 3 that a greater percentage of children's language is devoted to the imparting of information (language function No. 5) than to mere verbalizing for its own sake. While the different play variables do not markedly differentiate between the percentage of *imparting information* found among them, there is nevertheless a consistently high degree of this language function in all of them. It is difficult to be certain, in the sense that Piaget has been, as to the allocation of utterances to the category of *egocentricity* where language is spoken without concern for any hearer. That is to say, whether or not the observer is convinced that the child is, or is not directing his remarks at a hearer, there is room for considerable doubt regarding the child's unawareness of those about him. If, then, being aware of those about him, the child directs his remarks at no one in particular, do these remarks bespeak *egocentricity* in essence? This writer finds it unreasonable to accept any such proposition. Egocentric language should be sought in those circumstances where the child employs language as he does his toys, and where he adopts an *attitude* towards his own behavior characterized chiefly by absence of any concern for outcome or goal. Such language is *not directed* at any person in the environment any more than are the toys with which the child is occupied proffered to some other

person. If this is the concept of egocentric language which Piaget had in mind, then one may readily agree with him.

The language functions such as *reasoning* (Category No. 2), *argumentation* (Category No. 7), *Imaginative discourse* (Category No. 8) and the functions of *incoherent verbalizing*, *expletive*, and *salutation* (Categories No. 5, 9, 10, and 11) show a slight differentiation from one play variable to another, with more significant differences appearing between the three age groups. *Reasoning* is almost negligible for all play situations with the outstanding exception of passive play. Such play usually involves listening to stories, music, and exposition of thought content which appears to be provocative of cause-and-effect language and thought in the senior kindergarten age groups. Since it is difficult to tease out any further influences of play *per se* upon language usage without reference to its interrelationship with age as a variable factor, attention must now be focused on this interdependence.

c. *The relation of language usage to play and age.* For all the play variables taken as a whole, there appears to be twice as much language devoted to criticism in the kindergarten age groups as in both junior and senior groups combined. The progression of increased use of approbation and disapproval from the junior to the kindergarten group, moreover, as seen from the "mean" column in Table 3, is quite consistent with reasonable expectation. Thus, for each play variable taken separately, children aged 54 to 66 months consistently employ more *criticism* than their younger playmates, except for active, outdoor, unisexual play. Here, the oldest-age group of the sample studied displays a marked decline in their use of *criticism*. In the senior age group, no such decline is apparent; and from a check of the language records comprising the data assembled for the kindergarten group in the case under consideration, no reason can be assigned for the drop as noted except on a priori grounds. It must be concluded, therefore, that this behavior is atypical. For the senior group, more use of *criticism* is apparent in indoor play than in any of the other play situations. This is inevitable by reason of the more-closely knit social organization in indoor-play arising out of physical restraint as contrasted with the relative freedom of the wide, open playground. Thus,

the opportunities for *criticism* are increased through the more intimate contacts of active, indoor play.

Language devoted to *inquiry* displays some curious facts. The *mean* for this category is highest for the senior group; likewise, this group exceeds both junior and kindergarten groups consistently for all the play variables. This is especially apparent for play in pairs where 36 to 54 months old children exhibit almost twice as much questioning as both groups of younger and older playmates combined. From this study, one may justifiably dub the children in this group as the true representatives of the "questioning age."

While all three age groups appear equally as argumentative, varying somewhat in their use of *argumentation* from one play situation to another, junior-age children (18-36 months) display a marked increase in argumentative discourse when playing in pairs. Face-to-face contact at this age level seems to arouse conflict and incompatibility of desires which usually eventuate in the termination of the association. However, these children seem quite capable of enduring criticism from their fellows without any degenerative reduction to the level of argumentation, as evidenced from the relative percentages of language devoted to these two categories.

Junior-age children display considerably less imaginative discourse than their senior and kindergarten playmates throughout the different play situations with the exception of active, indoor, heterosexual play where a significant amount of make-believe language is exhibited. Kindergarten children exhibit more imaginative discourse in active, outdoor, unisexual play than do senior children, exceeding any of the other play situations. A significant amount of such language is revealed for both these groups in active, unisexual, indoor play also. It would thus seem that unisexual playmates stimulate each other to make-believe conversation.

Incoherent verbalizing appears more frequently with the youngest age group than with the two older ones. In the junior group, active, indoor, unisexual play appears to promote a significant amount of this type of language play. Oddly enough, playing in pairs is sufficient to cause a rise in such discourse among senior age children. Little comment is necessary as regards these children's use of *expletive* and *salutation*. If social greetings imply some amount of

social growth, it is natural to expect kindergarten-age children to use more of them than younger children.

2. *The Functional Analysis of Children's Language: The Analysis of Children's Language by Code B*

a. *The distribution of language functions obtained by the application of an adult scheme of classification.* Previous investigators have usually adopted Piaget's classification (32) or a modified form of his language-function arrangement in the study and analysis of their problems. The functional analysis presented in the preceding pages is based on an arrangement of language usages similar in scope to that of previous workers in this field. In this section is presented an analysis of children's language usages based on the application of a classification originally designed for adult language and effectively used in a study by Henle and Hubbell (13). Since these authors were primarily concerned with the element of *egocentricity* in adult language, their categories are quite germane to this study. These categories have been discussed above (see *Procedure*) as well as their application in the coding of the remarks assembled for this investigation.

Because of the dual coding system applied herein, some interesting comparisons will be apparent. However, no classification of language functions can be stretched to cover completely any differences between child and adult language. Rather more significant are the inter-study comparisons on the child level which alone justify the inclusion of a second system of codes.

The influence of the various play variables upon the language functions of this second system will be discussed first. Next, the interrelation between age and play as factors influencing language will be developed.

b. *The influence of play on language-function categories.* From Table 4 may be seen that throughout the different play situations children's language is devoted predominantly to statements of their activities, feelings, emotions, ambitions, desires, and interests (Category 1A); next, to commands and requests (Category 3B); and, thirdly, to non-evaluative statements about objects and impersonal events (Category 4A). Reference to the "mean" column of this table shows that almost 75 per cent of the language of junior-age

children is directed at these three functions. This tendency is particularly apparent from Table 5, which summarizes the categories listed independently in Table 4. There is some variation from one play variable to another in the percentage of ego-related statements, particularly in junior-age children, with a variation of .22 which is in excess of the least percentage appearing in passive play at that level. For this language function, the variation among the different forms of play at the senior level is .11, and for kindergarten-age children, .11 also.

Commands and requests show a variability among the different forms of play of .23 at the junior level, and of .13, and .29 at the senior and kindergarten levels respectively. For all age levels, this function is quite apparent in active, outdoor, heterosexual play, and in play-in-pairs. Active participation in outdoor play seems more conducive to this type of verbal behavior than indoor play. It seems to be not quite the least prevalent in passive play although it is present in significant amounts here too.

Objective statements are minimal for active, outdoor, heterosexual play and maximal for passive play for the age groups taken as a whole. There is a variability for this language function of .11, .11, and .12 at the junior, senior, and kindergarten levels respectively.

Active, outdoor, heterosexual play and play-in-pairs appear to evoke the least amount of opinions, evaluative and normative statements at the junior level. The least amount of this form of verbal behavior appears in active, outdoor, unisexual play at the senior level. Thus, for all age levels, active, outdoor play seems least conducive among the play variables of evaluative remarks.

Social statements made about other people and their activities appear quite consistently throughout the play situations studied here. It should be noted that this category is employed considerably less frequently than *ego-related statements*. This finding is particularly significant because of its implications. It is clear that the definitions assigned to the language functions which modify the interpretations thereof, from one observer to another, determine the resulting language usage arrangement no less than it is influenced by play. Thus, comparability among the different investigations is dependent upon these two factors of (a) definition and (b) cir-

cumstance. It is false procedure, therefore, to discuss the findings reported by different investigators abstracted from their methodologies. There is no reason to suppose that early language—even as adult language—should not vary from one behavioral context to another, whether this context is objective as observed by the investigator, or subjective as defined by him.

Active, outdoor, unisexual play appears to contrast with active, outdoor, heterosexual play as regards the frequency of social questions. Social forms consisting of stereotyped social phrases appear quite frequently in active, indoor, unisexual play at the junior level. With the exception of the kindergarten age group, the contrasting relationship mentioned for social questions appears also for social forms but in favor of the unisexual play in this case.

"We" statements about the joint activities of the speaker and another person, or about the activities of the "we-group" appear infrequently at the junior level except in passive play. At the remaining two older-age levels, this form of language is present in slightly varying amounts throughout the different play situations.

Objective questions are least frequent in active, outdoor, unisexual play at the senior and kindergarten levels. They appear least in play-in-pairs for junior-age children. This form of language is most frequent in passive play for all ages studied here. A priori, one might expect this to be so, for such activities as story telling and music appreciation promote objective thought.

Yes and No and equivalent phrases display some variability in their usage by children for different play situations. This form appears most frequently for junior ages in passive plays and in active, outdoor, unisexual play for the junior and older groups. Senior ages display this form least in passive play, while the remaining two groups have the lowest frequency in active, indoor, unisexual play.

It would thus seem that variability and differentiation is a fact when language is studied under a variety of circumstances. This variability is not restricted to play situations by any means. Nor do the different play situations influence different age groups equally. As mentioned previously, the interrelationship between age and play warrants at least as much analysis as either of these factors independently. Certain aspects of such an analysis are now presented.

c. Age and play factors in child speech. Kindergarten-age children on the average use more language involving opinion than both of the younger groups combined. These children exceed the younger playmates in the use of "we" statements on the average. However, there is a marked decline in the use of opinions at the kindergarten level in active, outdoor, unisexual play. In this form of play, these children display the most frequent use of "we" statements. Thus, while the oldest group studied gives evidence of more "we-group" awareness and ability to evaluate the circumstances surrounding their play than younger children, there is some indication that an increase in group awareness is attended by exercise of less criticism. Similarly, at the senior age level, with an increase in group awareness in active, outdoor, heterosexual play, there is some decrease in language devoted to criticism in this form of play. For junior-age children, group awareness as evidenced by language devoted to "we" statements is consistently low for all play situations excepting passive play. The mean for ego-related statements at this age level is however greater than that for either of the two older groups.

Age seems to play a minor rôle as regards the percentage of language devoted to social statements among the age groups studied. Social questions appear more frequently among senior age children, however. These and older children seem more impelled to questioning about other people in heterosexual play than in unisexual play. Younger children display curiosity about the activities of others about as equally in unisexual as in heterosexual play.

Passive play affects senior and kindergarten ages similarly as regards their infrequent use of social forms here. Unisexual play has the same influence upon kindergarten ages only, and outdoor play operates to diminish the use of social forms among the junior-age children.

Group awareness seems to increase markedly from the junior to the senior and kindergarten levels. Thus, while "we" statements are apparent only in passive play at the junior level figuring but slightly in active, indoor heterosexual play, it is consistently present in significant amounts for all play variables at the two upper levels. Outdoor play particularly evokes such language at these age levels.

Age differences in the use of commands and requests are slight

on the average, but different play situations elicit this form of verbal behavior in different amounts from one age group to another. Play in pairs, active, outdoor, unisexual play, and outdoor play evoke the most frequent use of commands and requests among junior, senior, and kindergarten ages respectively. Unisexual and passive play provoke the least amount of this language-function in junior children. Indoor play, and passive play operates similarly for senior and kindergarten children respectively.

Junior children appear to use more non-evaluative statements about objects and impersonal events than do the older children studied here. They employ this function particularly in passive play as do their older playmates. Heterosexual play causes the least amount of such statements in senior and kindergarten children, while play in pairs affects junior ages similarly. There is thus a contrasting effect of play-in-pairs upon juniors, and upon older children.

Junior children raise more questions about objects and impersonal events than do older children particularly in passive play, but less frequently in active, indoor play and play-in-pairs. Senior and kindergarten ages are less influenced in this regard in active, outdoor, unisexual play. Both at the junior and kindergarten levels, however, very little of this function appears in play-in-pairs. For the other play variables there is more consistent agreement between the two older groups.

Senior and junior children share a relatively high incidence of yes and no and equivalent phrases in active, outdoor, unisexual play and passive play respectively. At the kindergarten level, this influence noted for the senior ages is apparent too. Seniors tend to use these phrases rarely in passive and indoor play. There is a decrease too at the junior and kindergarten levels for indoor play.

d. *Comparison of the two functional analyses.* It is extremely advantageous to discuss the findings based on two dissimilar systems of codes when the same subjects are involved. Thus, a wider scope of treatment has been made possible in this investigation than otherwise may have been the case had only one method of coding been applied.

There is close agreement between the degree of social manipulation as shown in Table 3 and the frequency of commands and

requests evidenced from Table 4. The frequency of language devoted to imparting information (Category No. 5, Table 3), however, is not similarly reflected in the distribution of language functions according to *Code B*. Since children's language is devoted to this function in a large measure, the adult classification system of language categories is not adequately applicable in this regard. On the other hand, this scheme of classification is particularly applicable in its reflection of ego-related statements. Here, the researcher is amply rewarded in the generous percentages listed in the first row of Table 4.

There is considerable agreement in the incidence of mean percentages for *criticism* at the three age levels studied of .02, .07, and .18, respectively, and for *opinion* of .04, .08, and .14, respectively. Moreover, this consistency is apparent for the different play variables as well.

Obviously, not all the functions listed in *Code B* could be indicated in the language functions of *Code A*. Thus, an important deficiency in *Code A* is the function of group awareness (Category No. 3A, *Code B*). The dissimilarity between the two codes is especially apparent in the degree of egocentricity based on non-directed discourse in one and ego-related statements in the other. Here, the divergence of the codes is at their widest.

3. *The Analytical Structure of Children's Language*

a. *The influence of play on grammatical usage.* Reference to Table 6 shows considerable variability among the different play situations in the incidence of the major types of sentence used by the children studied. At the junior level, there is a variability for declarative sentences, .12; and for interrogative sentences, .06. At the senior level, these are respectively, .16 for declarative, .17 for imperative, and .13 for interrogative sentences. Kindergarten-age children are variable to the extent of .20, .18, and .20 for declarative, imperative, and interrogative sentences respectively. On the average, all age groups studied here use declarative sentences somewhat more than 50 per cent of the time. However, kindergarten-age children, increase this percentage markedly during passive play. For junior-age children, active, outdoor, unisexual play is provocative of the most frequent use of this type of sentence. Senior-age

TABLE 6
THE DISTRIBUTION OF GRAMMATICAL USAGE: THE PERCENTAGE OF GRAMMATICAL TYPES EMPLOYED BY 290 CHILDREN OF JUNIOR (J), SENIOR (S), AND KINDERGARTEN (K) AGES, IN SIX DIFFERENT PLAY SITUATIONS

Grammatical usage	Play variables												Mean J S K
	I		II		III		IV		V		VI		
	J	S K	J	S K	J	S K	J	S K	J	S K	J	S K	
Declarative	.58.61.52		.58.59.63		.54.51.53	.63.45.52	.52.54.70		.51.52.50				.56.54.57
Imperative	21.13.23		.14.18.20		.26.24.22	.17.30.12	.12.25.07		.34.20.25				.21.22.18
Interroga- tive	.11.22.23		.08.14.15		.14.17.20	.13.09.03	.13.18.18		.08.18.12				.11.16.15
Non- classifiable	.10.02.03		.18.05.02		.06.08.07	.10.15.07	.20.03.02		.07.10.05				.12.07.04
Incomplete	.05.02.01		.06.008.009		.02.03.02	.03.01.00	.04.01.005		.01.008.00				.03.01.007
Personal													
Pronoun	.45.64.64		.32.55.60		.60.54.71	.45.51.44	.23.57.57		.45.52.64				.41.56.60
Repetition	.04.06.07		.00.04.00		.06.06.06	.01.08.00	.01.03.01		.01.04.00				.02.05.02
Non- repetitive													
Generalisms	.10.008.04		.14.02.01		.00.02.01	.17.003.01	.20.03.005		.05.03.02				.11.02.02

children are stimulated similarly in active, indoor, heterosexual play. Since there is less overt activity in passive play than in the other two forms mentioned, there appears to be some tendency on the part of older children to substitute language for activity. Imperative sentences which usually involve social manipulation appear most frequently in play in pairs at the junior level. Senior age children display the next most frequent amount in active, outdoor, unisexual play. Kindergarten-age children resemble the youngest children, using imperative sentences most frequently in play in pairs. The oldest and youngest groups are similar too in their use of imperatives most infrequently in passive play. In this respect, then, senior-age children represent a transitional stage using the relatively same amount of imperatives in active as in passive play. Active, unisexual play seems to stimulate less use of interrogatives than active, heterosexual play at all age levels. The presence of children of the opposite sex calls for more inquiry, it seems, than when children of the same sex are playing together.

It is evident from the percentage of non-classifiable sentences throughout all play situations at the three age levels that children's language is not readily limited to the three major sentence types. In fact, at the junior level, there are more sentences not classifiable as declarative, interrogative, or imperative for passive play and for active, indoor unisexual play than either interrogative or imperative sentences. Children use language very often merely to communicate their presence to others or to arouse the attention of others to themselves. Social greetings are thus very common; and such greetings are rarely classifiable as sentences.

With increase in age, the development of ability to use sentences increases, however, so that kindergarten age children show a decrease in their percentage of non-classifiable and incomplete sentences. The incidence of personal pronouns increases with age also. At the kindergarten level, there is the highest frequency of personal pronouns in active, outdoor, heterosexual play. Senior and junior-age children too use these pronouns most frequently in active, heterosexual play.

It is significant that with respect to grammatical usage dependent as it is upon developmental factors there is nevertheless considerable variation from one play situation to another. Some slight

TABLE 7
MEAN SENTENCE LENGTH: MEAN NUMBER OF WORDS PER REMARK AT DIFFERENT AGES IN SIX DIFFERENT PLAY SITUATIONS

Age group	I	II	III	IV	V	Play variables			σ_M	D/σ_D
						VI	Range	V*	Mean	
Junior (18 to 36 mos.) N=66	4.6	4.2	4.7	3.8	4.0	4.7	0.9	14.99	4.3	.29
Senior (36 to 54 mos.) N=114	5.8	5.9	5.5	5.9	5.3	5.2	0.7	13.40	5.6	.34
Kindergarten (54 to 66 mos.) N=110	6.0	6.7	5.6	5.7	7.5	6.5	1.9	12.54	6.3	.36
										5.0 (J&K)

V*Coefficient of variation.

variation is apparent too in the mean sentence length for different play variables (Table 7). Thus while the mean number of remarks for this investigation at the junior level confirms the finding of McCarthy (Table 8) in this regard, this mean is somewhat

TABLE 8
MEAN NUMBER OF WORDS PER REMARK AT DIFFERENT AGES, AS FOUND BY
McCARTHY (22) AND DAVIS (7a)

Age in years	No. of cases	Girls	Boys	Both Sexes	SD	σ_M
<i>McCarthy</i>						
3½	20	4.4	4.2	4.3	2.83	.69
4	20	4.4	4.3	4.4	2.86	.69
4½	20	4.7	4.6	4.6	2.95	.69
<i>Davis</i>						
5½	248	4.6	4.5	4.6	1.41	.09
6½	63	5.5	5.5	5.5	1.37	.17
9½	125	6.7	6.7	6.5	2.30	.20

exceeded by the mean for play in pairs and active, heterosexual play. At the senior level, the mean for all play variables exceeds that found for 4½ year olds by McCarthy. The mean finding at the kindergarten level is almost equal to that for 9½ year olds found by Davis (7a). It is noted that the reliability of the difference is significant as between juniors and seniors to a greater degree than as between seniors and kindergarteners. Such findings confirm the influence of play upon language.

b. *Summary of the grammatical analysis.* The major types of sentences, declarative, imperative, and interrogative, are used with considerable variability in the different play situations at all age levels studied here. Declarative sentences are used more than 50 per cent of the time by these children. This percentage varies with the form of play, increasing to 70 per cent for passive play at the kindergarten level.

The most frequent use of imperative sentences occurs in play-in-pairs at the junior-age level (18 to 36 months). At the senior level, this form is most frequent in active, outdoor, unisexual play; at the kindergarten level, play-in-pairs evokes the greatest frequency. There is some evidence for the possibility of a transitional

stage in language occurring during the age period of 36 to 54 months, inasmuch as greater similarity exists between junior and kindergarten ages in some language aspects than between the senior and one of the other groups. More investigation of the rôle of age in these language aspects is warranted, however, before any evidence may be adduced as final.

Children of the same sex appear to use less interrogatives in their play than children of both sexes. All children use, at one time or another, sentences not readily classifiable as either declarative, imperative, or interrogative. This is particularly true for 18 to 36 months old children. Incomplete as well as non-classifiable sentences both show a tendency to diminish in frequency as children advance in age. The frequency of the use of personal pronouns increases with age.

Mean sentence length in words shows a slight variability for different play situations. The findings of this investigation in regard to the mean number of words per remark at different age levels seem to indicate an increase in this mean at the three levels studied for certain forms of play as compared with the mean finding of other investigators.

F. CONCLUSIONS

It was stated at the outset of this study that inquiry was being made into the variation of children's language with different situations arising out of their play. The balance between *socialized* speech and *egocentric* speech has been investigated. A determination of the relationship between *egocentric* language as defined by Piaget and certain play situations has been attempted. The criteria set up for the gathering of the data were: the extent to which play serves as a *selector* of children's language; its interrelationship with age in producing its results; and, the analysis of language observed under these circumstances by the application of specific techniques.

Conclusions on the basis of the findings reported here are of necessity restricted to the preschool population of urban centers. They are supported by the evidence already discussed which does not need repetition here. That they are meaningful only in terms

of such evidence and never apart from it has already been emphasized in the discussion of previous investigations.

1. *The Variation in Language Usage with Play*

1. Language functions, e.g., social manipulation, criticism, imparting information, inquiry, "we" statements, etc., vary sometimes markedly, often less significantly, with different play situations such as active, outdoor, heterosexual play, passive play, play-in-pairs and the like.

2. These variations are present at different age levels and display a high degree of consistency heretofore not demonstrated.

3. The variations in language usage resulting from play are equal in magnitude to those resulting from age differences.

4. Grammatical usage determined by objective analysis of sentence structure, and mean sentence length display a significant and slight amount, respectively, of variability with play.

5. The range of variability for the different play situations, depends upon (a) the age level of the children, and (b) the language function employed.

6. That language-functions in children's speech vary with play may be demonstrated by the analysis of their language either by (a) a classification system constructed along the lines laid down by Piaget, or (b) an adult system of classification.

2. *The Relative Amounts of Socialized and Egocentric Speech*

1. At all ages from 18 to 66 months, considerably more language is devoted by children to social manipulation than to egocentric remarks. This conclusion favors the work of McCarthy rather than the findings of Piaget.

2. For a variety of play situations, children exhibit much more the tendency to evoke a response in their hearers than to verbalize for its own sake.

3. For very young children, aged 18 to 36 months, there is a tendency to use more egocentric language in certain forms of play than language devoted to social manipulation in those forms.

4. At certain age levels, e.g., 18 to 36 months, 36 to 54 months, and 54 to 66 months, the degree of variability for egocentric talk is consistently and markedly greater than that for social manipulation.

5. As compared to language devoted to commands and requests, language employed to describe the speaker's experiences is not significantly in excess for children aged 18 to 66 months.

6. Socialized speech as measured by group awareness is considerably less than ego-related statements in children of these ages.

7. Ego-related statements, while more frequent than *ego-centric* remarks are not as frequent as utterances employed for social manipulation.

3. *The Influence of Play on Egocentricity*

1. Early language exhibits a degree of egocentric speech dependent upon (a) the age of the children and (b) the play in which they are participating.

2. Ego-related statements used by children in a series of play situations show a marked degree of variability at all ages from 18 to 66 months.

3. Ego-related statements are a function more markedly influenced by play than by differences in age.

4. *Play as a Selector of Language*

1. Certain forms of play possess an affinity for particular language-functions, as for example, active, outdoor play for social manipulation; active, indoor play for criticism; passive play for reasoning; and passive play for the utterance of opinions at the age level, 54 to 66 months.

2. Play "selects" the age and sex, each factor operating independently nonetheless, when particular language functions are highlighted, for example, as in the frequent use of socialized speech-statements, questions or social forms—in the development of the child's use of language.

3. Play reveals the element of group awareness as it is evidenced in certain age periods in the course of the child's development.

4. Language studied in play situations shows less variability from one situation to another in grammatical usage than in functional intent.

5. *Methods of Analyzing Children's Language*

1. The original methodology of Piaget in classifying the language of children based on the functions intended in their speech is fundamental to any analysis of this early verbal behavior.

2. The Piaget approach to the study of children's language, capable of securing a marked degree of agreement on the part of different observers, emerges more significant than any specific finding relative to egocentrism in child speech.

3. A classification system of functions employed in child speech devised on the basis of Piaget's system of functional analysis is more revealing in this regard than a classification system adapted for adults. Each, however, reveals characteristics not evidenced by the other.

4. The trends resulting from an analysis of children's speech depends (a) no less upon the influences of play than upon (b) the factor of age, (c) socio-economic status, (d) geographical location, and (e) the investigator's interpretation of the categories of language into which the independent utterances are grouped.

6. *Implications of the Study*

There is no justification in the evidence as yet uncovered for the predilection of assigning an *egocentric* rôle to early verbal behavior. The child does not develop from a little egoist into a social human being, but plays both parts concomitantly. He is no more a "non-conformist, or relatively unsocial being" (35) than he is motivated to be. True, he is motivated *egocentrically* more *apparently* than his elders, but not more *frequently*. If adult psychology were written by children, similar generalizations might be drawn of adult behavior to those drawn of child behavior by adults. This is so when the naïvete of the observer is not equal to that of the subject which is pre-supposed in making true observations. As with adults, so with children, language is most of all an effective tool in promoting social organization.

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War Manpower Commission
Atlanta, Georgia

COMPARISON OF THE REASONING ABILITY OF TWO AGE GROUPS*

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In a previous report, the reasoning ability of children from six to eight years of age was studied in experimental situations which made use of inductive principles. The present experiment was designed to serve as a check on the earlier findings. The same tests were administered to children from four to six years of age, which made possible both an extension of the analysis of the difficulty of the tests, which had been passed by the older group of subjects, as well as an investigation of the reactions of the younger children to tests which had been failed at the higher age levels. The records were also analyzed for "hypotheses" or "systematic responses."

Three types of inductive principles were employed in a number of situations.

A. IDENTITY RELATIONSHIP PROBLEMS

1. *Marble Problem*

The material consisted of three small boxes with removable lids. The lids of these boxes as well as three extra lids were painted different colors. Before each trial marbles of the same color as the lids were placed in the three boxes. The first two lids were raised in succession. Thus the child was allowed to observe the correspondence between the color of the lid and the color of the marbles in two instances. Before the third lid was raised the child was required to indicate the color of the marble which would roll out of the third box. This procedure continued until 30 trials had been completed, or until the criterion of 10 consecutive correct identifications had

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been fulfilled. The materials were re-arranged in a chance order after each trial.

2. Doweling-Shape Problem

This situation is schematically illustrated in *A* of Figure 1. Three

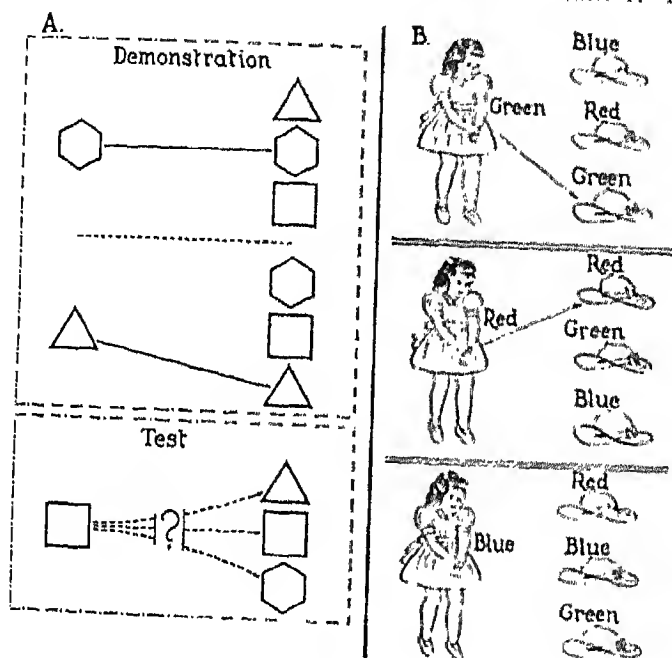


FIGURE 1

small blocks of different shapes were attached to a small piece of doweling and the mechanism was arranged so that pressing one of the single blocks caused one of the group of three to jump up. In this test the shape of the single block (cause) and the shape of the block that jumped up (effect) were the same. For example pressing the hexagonal block caused the block of the same shape to jump up. The child pressed the first two single blocks in succession. Before pressing the third block the child was asked to predict which one of the third group would jump up. Here again 30 trials, or as many less as were necessary to obtain 10 consecutive correct responses were

given. From trial to trial the arrangement of these blocks was varied according to a prearranged random order.

3. *Doweling-Color Problem*

This test made use of the same doweling apparatus, but the blocks varied in color instead of shape. Only 10 trials were given with the colored blocks regardless of the correctness of the response.

4. *Picture Problem*

Pictorial materials, rather than three dimensional objects, were employed in this test. An illustration of one of the 10 cards is presented in *B* of Figure 1. It will be seen that the girl wears a hat the color of which is the same as the color of her dress. The child was shown which hat the girl in the first two instances would wear and then the subject selected the hat the third girl would wear. Ten different arrangements were presented to each subject.

5. *Word Problem*

Written material was utilized in this test to tell a story about three little mice and the type of cheese they ate. For example, the first-floor mouse was described as eating first-floor cheese; and so on for the second- and third-floor mice. The grouping was identical with that in the other tests just described. Here the child was asked to predict which of the three types of cheeses the mouse in the third group would eat after the experimenter pointed out the type of cheese that the mice in the first two groups would eat. Ten different arrangements were presented to each subject.

In these five problems the two terms of the relationship, for example, the color of the lid and the color of the marbles, were qualitatively alike (identical) but different colors were used successively to demonstrate this relationship. Therefore, problems of this type were called *identity relationship problems*.

B. ABSTRACT CAUSAL TERM PROBLEMS

The material used in these two problems consisted of small pill boxes with geometrical designs drawn on the lids. They were presented in pairs, one positive and one negative.

1. *Box-Number Problem*

In this situation boxes with two designs always contained candy, whereas the boxes with one figure never contained candy. The relationship—twoness and candy—held throughout this series, but the size, shape, and method of depicting the figures varied. The antecedent, *twoness*, and the effect, *candy*, were constant.

2. *Box-Shape Problem*

A similar type of relationship between candy and *circularity* operated in this situation. The negative stimuli were triangles. Both the positive and the negative stimuli varied in number, size, and method of representation of the figures.

When the first pair of boxes in either series was presented the child was instructed to open both boxes and find which contained the candy. To help the child remember which boxes contained candy, he was told to place the box with candy in one place and the box without candy in another. The child received the candy only if the positive box was selected first. The pairs of boxes were presented until the child selected the positive box 10 times in succession, or until 30 trials were completed.

In these two problems the relationship between the cause (circle or twoness) and the effect (candy) was an artificial one. No inherent connection existed between cause and effect as it did in the identity-relationship situations. The solution in the former type of problem necessitates the isolation of the antecedent necessary for the occurrence of the effect. The characteristics of the antecedents (circularity and twoness) varied but the abstract concepts always determined the correct box. Consequently, problems of this type will be referred to as *abstract causal term problems*.

C. JOINT METHOD PROBLEMS

Two problems of this type were presented to each of the subjects.

1. *Dial-Direction Problem*

In this test the determining variable was direction. The general spatial arrangement was similar to that shown in Figure 2 in that there were four rows with two elements in the first three rows and

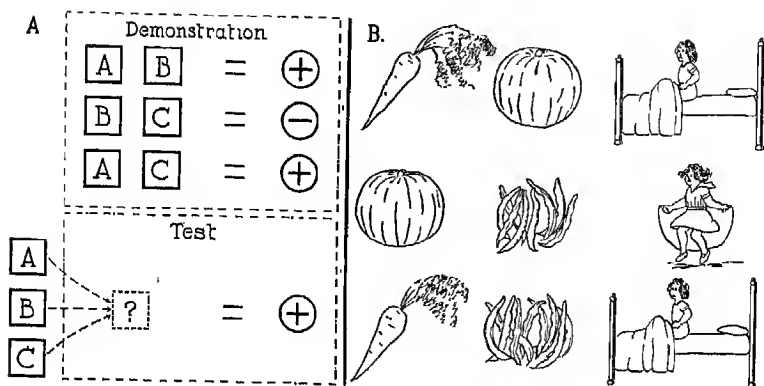


FIGURE 2

one in the fourth. At the end of each row there was a light which lit when the correct solution occurred and which, therefore, in this test served as the effect. Soldiers mounted on the end of a pivoted platform replaced the letters of Figure 2. Direction was emphasized by the pointing of the soldier's gun. In the experiment the four main directions of the compass were used. The experimenter set the soldiers of the first three rows one at a time, calling the child's attention to the presence or absence of the light. In any one trial three different directions were used, two soldiers of different rows pointed to each of these positions; and in two of the first three rows lights were on. The subject was instructed to place the soldier in the fourth row so that the light would go on. The light went on only when the direction common to the two rows with lights was selected. If the selection was incorrect, the child realized he had made a mistake because the light did not go on, but he did not know which of the three remaining positions was correct. The directions used from trial to trial were determined by chance, as were the positions of the causal directions in both rows and columns. This situation was presented for 30 trials or until 10 consecutive correct responses were made.

2. Block-Form Problem

This test made use of blocks embossed with six different species

of animals. Three species were used for any one trial. Figure 2 presents the schematic arrangement of the blocks. The three rows of blocks were placed by the experimenter and the child's attention was called to the presence or absence of the light in each row. Three additional blocks were then presented to the child with the instructions to select the animal that would make the fourth light go on. Only the correct block, namely, the type that was found opposite the two lighted bulbs (indicated by *A* in Figure 2) would make the fourth light go on. The child was given only one choice; consequently, he worked with knowledge of correctness versus incorrectness, but if the response was of the latter type he did not know which of the two remaining blocks was the correct one. The apparatus was then removed from the child's field of vision while the experimenter prepared the apparatus for the next trial. To rule out the possibility that the problem was being solved by another principle many elements of the situations were varied in a chance order; for example, the combination of the species used from trial to trial, the position of the causal block in both rows and columns, and the position of the three blocks presented to the child. This test was continued until 30 trials were completed or until 10 consecutive correct identifications were made.

In these problems the effect was constant (as was the case in the abstract causal term problem), but the cause was one of three specific elements. The correct antecedent could be determined from the relationship between the several elements and the consequence. In these problems the possible causes were presented in such a manner that Mill's Joint Method of Agreement and Difference could be employed in determining the correct antecedent. In the block-form problem a certain animal will cause the light to go on, but all of the elements are animals so that the concept "animal" by itself would not help the child solve the problem. A specific animal must be isolated. This problem might be called a "concrete causal term problem" to distinguish it from the second type of situation "abstract causal term"; however, since the particular animal can be isolated by the method described by Mill, we shall use the more familiar name *Joint Method Problem* rather than the newer and more descriptive designation: "concrete causal term."

D. SUBJECTS

These nine tests were presented to 10 children between the ages of four and six years. The exact chronological ages will be found in Table 1 along with the mental ages and *IQ*'s as determined by the revised form of the Stanford-Binet Test.

TABLE 1
AGE, SEX AND INTELLIGENCE TEST SCORES OF SUBJECTS

Subject	Sex	<i>CA</i> Yr. Mo.	<i>MA</i> Yr. Mo.	<i>IQ</i>
BM	F	4-3	5-2	122
EW	M	4-4	5-2	119
ED	F	4-7	4-10	106
AR	M	5-0	6-0	120
JS	M	5-2	5-11	115
KH	F	5-2	5-11	115
RoM	M	5-3	5-7	106
RiM	M	5-3	5-9	109
RF	M	5-3	5-7	107
GG	M	5-4	5-4	100

E. RESULTS

1. *Identity Relationship Problems*

The marble test was passed by nine of the 10 children. All of the children verbalized the principle, but only two mentioned the mental set created by the agreement in the first two boxes. The other children merely indicated that the color of the lid of the third box and the color of the marbles that rolled out of this box were the same.

Three children fulfilled the criterion of passing in the initial doweling-shape test. They were able to verbalize the principle, but they did not mention the mental set that operated in this situation as some did in the case of the marble problem. After an interval of one month this test was again presented to the 10 subjects and a hint was given after each error. Using this procedure all but the two youngest children succeeded in satisfying the criterion of 10 consecutive correct responses in 30 trials. Seven of the children needed less than four hints, whereas 11 were necessary for the remaining child.

The three remaining identity relationship problems (doweling-color, picture, and word) were presented to the eight children who

passed the doweling-shaped retest. Each problem was presented for 10 trials and no hint was given. The number of correct responses in 10 trials will be found in Table 2. These tests were

TABLE 2
IDENTITY RELATIONSHIP PROBLEMS: NO. OF CORRECT RESPONSES IN 10 TRIALS

Subjects*	Initial test			Retest		
	Doweling-color	Picture	Word	Doweling-color	Picture	Word
ED	10	10	2	9	10	3
AR	10	10	4	9	10	9
JS	10	8	7	9	10	9
KH	10	10	10	10	10	10
RoM	9	10	6	10	9	2
RiM	10	10	3	10	10	2
RF	5	10	0	6	10	4
GG	10	10	6	10	8	7
No. of S's passing if criterion =						
" " = 6	7	8	4	8	8	4
" " = 7	7	8	2	7	8	4
" " = 8	7	8	1	7	8	3
" " = 9	7	7	1	7	7	3
" " = 10	6	7	1	4	6	1

*The subjects are arranged in ascending order of chronological age.

administered again a month later. The same procedure was used and the results for the retest are also presented in Table 2. It will be seen that the scores for the doweling-color and picture problems are very similar, whereas those for the word problem are considerably lower. To evaluate this difference, the scores on the various problems were considered as paired measures and Student's "t-test" was applied. The difference between the scores on the doweling-color and picture problems can be explained on the basis of chance fluctuations, but the scores on the word problem were significantly lower than those on either of the other two problems. This was found to be true for the initial test and the retest scores.

The same statistical procedure was employed to obtain a measure of the reliability of the different situations. The initial test scores were paired with the retest scores for each of the three problems and the differences between the two scores for each test were too small to be considered significant.

2. Abstract Causal Term Problems

Two of the subjects satisfied the criterion of 10 consecutive correct

responses in the box-number test, whereas three others succeeded in doing so in the box-shape problem. In no instance did any of the subjects solve both of the problems. All five of the children who satisfied the criterion were able to give an adequate explanation of the principle involved in the situation they passed.

3. *Joint Method Problems*

The dial-direction and the block-form problems were extremely difficult for the subjects. No subject succeeded in fulfilling the criterion of 10 consecutive correct responses within 30 trials. An attempt was made after an interval of one month to help the children discover the principle by presenting systematic hints every time an error was made on the block-form problem. Only one child benefited enough to make 10 consecutive correct responses. This child was given an opportunity to apply the principle to other situations. When the animal forms were replaced by colored blocks the child generalized. But in all of the other tests administered to the older group of children (1) she failed to make a score above six in 10 trials. Her retention of the principle was measured by retesting with the block-form problem. She failed to satisfy the criterion within 30 trials.

4. *Hypotheses or Systems Used in Solving the Problems*

The records were analyzed to determine what hypotheses or systems were employed in solving the various reasoning problems. As in the previous experiment (1) it was with some reservation that such a procedure was used. Statistical devices may indicate that the child is employing a principle of which he may not actually be aware; on the other hand, a child's responses may be determined for a few trials by an hypothesis which is operating on a conscious level, but which may not be indicated by the statistical analysis because it is discarded too soon. In spite of these possibilities the desirability of an objective analysis can hardly be questioned. Consequently the data from the various problems were evaluated by the chi-square test.

An analysis of the doweling-shape records indicated that the two youngest children may have responded to cues that would make the correct principle difficult to discover. One child selected the hexagon more than half of the time, whereas the triangle was selected only

twice in 30 trials ($P < .01$). Actually all three forms (square, hexagon, triangle) were correct approximately the same number of times. Another child selected the end block, the last one on the board, 24 times out of 30 trials ($P < .01$).

Several hypotheses were found in the records of the abstract causal term problems. One subject in both of these problems selected the box on his right much more frequently than the one on his left ($P < .02$ in box-number problem; $P < .01$ in box-shape problem). Another child consistently selected the box with one figure in the box-number test ($P < .02$). A third child tended to prefer certain geometrical shapes in the box-number situation. The square and the circle were selected in 23 out of the 30 trials, whereas the rectangle and the triangle were selected only seven times ($P < .05$; $d_f = 3$).

In the dial-direction problem of the Joint Method type the positional cue was found to operate in the records of five children. Two subjects selected the North direction much more frequently than any other. A third child selected North and South, but ignored East and West. A fourth child selected East while a fifth selected West. In all cases the P -values are less than 0.01. A second positional hypothesis involved the selection of the direction occupied by a certain group of soldiers. One child selected a direction indicated by the soldiers in the column away from the light almost twice as often as he selected the direction indicated by the soldiers near the lights ($P < .05$).

The position of the extra blocks in the block-form problem seemed to be important in determining the responses of three children. Two subjects selected the first and third blocks but ignored the middle one (P -values: $< .02$ and $< .01$). The third child selected the block on the right a disproportionate number of times (P -value: $< .05$).

5. *Comparison of Performance of Four- to Six-Year Group with That of Six- to Eight-Year Group*

The results presented above can be compared directly with those obtained in the previous study (1). The age range in the latter study was from six to eight years whereas the age range in the present experiment was from four to six years. An examination of the IQ 's of the children indicates that the groups are approximately equal. The average for the older group was 106 whereas the average for the

younger group was 112. This difference was found not to be significant when Student's "*t*-test" was applied ($P > .20$). When the number of children passing (i.e., fulfilling the criterion of 10 consecutive correct responses) the marble or the doweling-shape (initial or retest) situations was compared it was evident that the children in the older group were more successful, but the chi-square values indicated that this preponderance was not sufficient in any of the reasoning problems of this type to conclude that there was a reliable difference between these two age groups. Although the older group's performance on this battery of tests was superior, the data suggest that the tests do not clearly differentiate the two groups.

A similar analysis of the number of children passing and failing on the abstract causal term problems (box-number, box-shape) led to the suggestion that the children of the older group were superior on problems of this type. Thirteen of the 15 children of the older group passed the box-number problem, whereas only two of the 10 children of the younger group were successful. The chi-square test indicated that this difference was a significant one ($P < .01$ with Yates' correction applied). The difference in the box-shape problem was not significant.

The performance on the dial-direction and block-form tests of the Joint Method problems was practically the same if only the initial tests are considered. It was, however, found that children in the older group benefited from the standard hints which were given when the block-form problem was presented as a retest. These hints made it possible for all except two of the 15 children of the older group to pass the test, whereas only one of the 10 children in the younger group benefited enough by the hints to fulfill the criterion of passing. The superiority of the older group is unmistakable in this situation.

The above comparisons have been limited to performance on the initial material without regard to the ability to generalize principles. In the previous paper the subject's ability to generalize was tested in two different types of problems—identity relationship and Joint Method. A comparison of the older and younger groups was impossible in the case of the Joint Method problems since only one child of the younger group was able to fulfill the criterion of passing the block-form test and was given the additional Joint Method problems. Consequently the comparison will be limited to the identity relation-

ship problems. These tests were administered to all 15 children of the older group but to only eight of the younger group since two of these children failed to pass the initial test. Since our use of a maximum score produced a skewed distribution it seemed appropriate to apply a statistical technique which would be relatively independent of the distribution. Therefore the data were examined with the view of applying the chi-square test. The null hypothesis set up for testing was that no difference existed between the performance of the two groups on these tests. If the hypothesis were true the score for the younger and older children would be distributed in a chance fashion when the scores for each test were arranged in ascending order. On the other hand, if the lowest eight scores on a given test, e.g., doweling-color, were made by children of the younger group, the null hypothesis would have to be discarded. For each problem a chi-square table was set up to evaluate the frequency with which the eight lowest scores and the 15 highest scores fell in the younger and older groups. In the case of two situations, doweling-color and picture, the distribution was a chance one and the two groups were not clearly differentiated. In the word test the null hypothesis was not verified since a significant P -value was obtained ($P < .05$). On this test the performance of the older group was definitely superior to that of the younger.² These results indicate that the children of the older group were able to generalize the reasoning principle to a greater degree than were the younger ones. It should, however, be pointed out that the members of the former group worked with a definite advantage in so far as they had had more experience with printed material.

The final comparison involves the use of hypotheses by children of the two age groups. Practically all of the subjects of the older group passed the doweling-shape problem within a few trials. Consequently it was not feasible to try to analyze the records for systems. The responses of two children of the younger group suggest that incorrect hypotheses were developed. In the case of the abstract causal term problems three subjects of the younger group apparently used incorrect hypotheses. No systems were found among the older group on these particular problems. From the records of the dial-

²The results on all three problems indicate the same conclusion regardless of whether the initial test or the retest scores are considered.

direction problem it was found that six children of the older group and five children of the younger group developed incorrect hypotheses. In trying to solve the block-form problem three children of each group developed incorrect hypotheses. From such crude analyses it can be suggested that more hypotheses per child were present among the younger children. Since the total number of systems was rather small the interpretation must be tentative. It should be pointed out that the failure to detect hypotheses in the data of the older children by means of a statistical technique may be attributed to the fact that they shifted their approach more rapidly than did the younger ones. It would be desirable to have more information on these points.

F. SUMMARY AND CONCLUSIONS

A battery of nine reasoning tests was presented to 10 children varying in age from four to six years. These tests can be classified into three groups: identity relationship, abstract causal term, and Joint Method problems. The aim of the experiment was to compare the performance of these children with that of 15 other children ranging in age from six to eight years, to whom the same group of tests were administered. Specifically the children were to be compared on their ability (*a*) to discover the principles, (*b*) to profit by hints, (*c*) and to generalize to other reasoning problems solvable by the same principles.

It was found that the two groups were very similar in so far as discovering the principles was concerned. The superiority of the older group was found to be reliable in only one of six problems. The children did, however, differ in their ability to benefit by hints. Hints enabled all but two of the 15 children of the older group to pass a test of the Joint Method type, whereas only one of the 10 children of the younger group passed. In the battery of tests three problems similar to the two initial identity relationship problems were presented to obtain a measure of generalization. These differed in the type of material: three-dimensional blocks, pictures, and words. On the first two problems the difference between the two groups was unreliable. In the word problem the older group was definitely superior. This superiority might be attributed to the fact that the older children have had a little more experience with printed material.

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CONSISTENCY OF RESPONSE TO PERSONALITY TESTS AT DIFFERENT AGE LEVELS*

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Inventories, questionnaires, and schedules of all sorts are now coming into general use for measuring different aspects of personality. Inventories measuring emotional stability, introversion-extraversion and the like are now available for children in the grades, for adolescents, and for adults. It is, therefore, pertinent to enquire whether we may expect younger children to react to these inventories as consistently as do the more mature subjects when similar inventories or identical inventories are administered to them. By consistency is meant the tendency of the subject to mark the items of the second trial of the test in a similar manner to the first trial of the test after a relatively short intervening interval. The interval we have used is two weeks, during which period we assume that no real changes in such personality traits as emotional stability, ascendance-submission, or introversion-extraversion are likely to take place.

A. FIRST EXPERIMENT

1. *Subjects and Tests*

Three groups at different age levels were used: (a) 100 boys and girls in Grade V were given the *Aspects of Personality Test* (3); (b) 74 boys and girls in Grades X and XI in High School were given the *Bernreuter Personality Inventory* (1); (c) 81 college students in their senior year were given the *Thurstone Personality Schedule* (4).¹ With each group the tests were given twice with an intervening interval of two weeks.

2. *Results*

There are several ways of comparing the consistency of response

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¹We are indebted to Prof. James F. Bender for the administration of the *Thurstone Personality Schedule* to the 81 seniors at the Polytechnic Institute, Brooklyn, New York.

of these three groups of subjects. We shall first compare the re-test correlations of the total scores on the tests, which will show to what extent the relative positions of the subjects remain the same on the two trials. We shall then compare the groups with reference to the percentage of items marked in the same manner on both trials of the test.

a. Re-test correlations. The re-test correlations for the three groups are shown in Table 1. These are shown in the rows design-

TABLE 1
RE-TEST CORRELATIONS, FIRST EXPERIMENT

100 CHILDREN—CORRELATIONS, FIRST EXPERIMENT						
	A-S	E.I.	E.			
100 Children—Aspects of Personality Test						
<i>r</i>	.66	.70				
<i>S-B Formula</i>	.93	.94				
74 Adolescents—Bernreuter Test						
	<i>N</i>	<i>S</i>	<i>I</i>	<i>D</i>	<i>C</i>	<i>S</i>
<i>r</i>	.86	.85	.89	.92	.91	.87
<i>S-B Formula</i>	.92	.91	.94	.95	.95	.92
81 Adults—Thurstone Inventory						
<i>r</i>	.94					

nated by *r*. The three parts of the *Aspects of Personality* show correlations of .66, .70, and .82. The six traits of the Bernreuter show correlations ranging from .85 to .92. The *Thurstone Inventory* gives only one score and the re-test correlation for this is .94. These correlations, however, are dependent upon the number of items in each test, and, as the number varies greatly from test to test, they are no real indications of the tendency toward consistency of the three different groups of subjects. To obtain some idea of what this consistency tendency might be, if the three tests all had the same number of items, we have used the Spearman-Brown Prophecy formula for the two shorter tests. The *Thurstone* test is the longest, having 223 items; the Bernreuter has 125 items; and each part of the *Aspects of Personality* has only 35. The coefficients resulting from this theoretical increase of the test items are shown in the rows of Table 1 marked *S-B Formula*. All of the correlations in these rows are in the nineties, similar to the correlation of .94 for the adults on the *Thurstone* test. Theoretically, therefore, if we could lengthen our tests to equal the *Thurstone* test for adults, other things being equal, we

should find little or no difference in the consistency of the scores with different age groups. Actually, as the tests now stand, the consistency of the scores increases with increase in age.

Now, instead of enquiring as to what we might get if we lengthened the tests, we can make a much more practical and direct comparison by shortening the long tests to make them equal the number of items in the shortest test. Since each of the three parts of the *Aspects of Personality* contains 35 items we have divided the Bernreuter and Thurstone tests into three tests of 35 items each by taking the first 35, the last 35, and the middle 35 items. The re-test correlations for these "tests" of 35 items are indicated in Table 2.

TABLE 2

<i>Aspects of Personality</i>		.66	.70	.82			
<i>Bernreuter</i>	First 35	.85	.68	.89	.78	.82	.83
	Last 35	.83	.75	.84	.80	.76	.83
	Middle 35	.79	.74	.72	.83	.73	.79
<i>Thurstone</i>	First 35	.90					
	Last 35	.89					
	Middle 35	.88					

We note at once that our three Thurstone "tests" with adults obtain the highest re-test correlations. The adolescents on the Bernreuter vary all the way from .68 to .85. The children on the *Aspects of Personality* seem lowest.

b. Percentage of unchanged responses. Another way of estimating consistency is to count the number of responses which are the same on test and re-test for each subject. We have done this for each subject and have turned the number of unchanged responses into a percentage of the total number of items of the test. This percentage may be regarded as a measure of the consistency of response of each subject. Table 3 gives the pertinent data. The first row tells us that the mean percentage of consistency for the 100 children on the Ascendence-Submission test of the *Aspects of Personality* was 76.8. The sigma for the 100 cases was 3.5. The least consistent child had 55 per cent of unchanged responses and the most consistent marked 97 per cent of his responses on the second test in the same way as on the first test. On the Bernreuter test we now have only one value for each subject because the various "traits" measured by the test

TABLE 3
PERCENTAGE OF CONSISTENT RESPONSES, FIRST EXPERIMENT

		Mean	Sigma	Range
Children—Aspects of Personality	<i>A S</i>	76.8	3.5	55-97
	<i>E.I.</i>	78.5	2.9	55-94
	<i>E.</i>	83.3	3.9	40-100
Adolescents—Bernreuter		74.7	9.3	42-88
Adults—Thurstone		56.7	5.8	65-96

are all based upon different weightings given to the same basic test. When we calculated the percentage of consistency for samples of 35 items of the Bernreuter and Thurstone tests for comparison with the 35 item sub-tests of the *Aspects of Personality* we found as before that the adults had higher consistency scores than the children and the adolescents.

B. SECOND EXPERIMENT

The first experiment just described used three standard personality tests at the three age levels. Each age level used a different test. In the second experiment the same test items were given at all three levels and repeated again after a two-week interval.

The test used was an adaptation of the *Aspects of Personality Test* and was called the "*How I Feel*" Inventory. It had two parts. Part I was made up of 29 items of the Extraversion-Introversion sub-test of the Aspect of Personality, and Part II of 42 items of the Emotionality sub-test.

The subjects consisted of 158 pupils in the fifth and sixth grades of a public school, 110 pupils in the ninth year of a public junior high school, and 132 college women students.

1. The Results

Table 4 shows the re-test correlations for the two parts of the test for the different age levels. There is not much difference between the various age-levels here. None of the differences between any two r 's for any one part of the test are statistically significant. However, we have combined the r 's of Part 1 and 2 for each of the three groups. The use of PE_r to indicate the reliability of an obtained r has been questioned by Fisher (2) especially for r 's less than .70. Another

TABLE 4
RE-TEST CORRELATIONS—SECOND EXPERIMENT

		r	PE_r
158 Children	Part I	.72	.025
	Part II	.82	.018
110 Adolescents	Part I	.79	.024
	Part II	.79	.024
132 College Students	Part I	.78	.022
	Part II	.88	.013

method was used to test the r differences. Using Tippett's (6) procedure these r 's were transmuted into z 's. None of the differences between any two groups divided by the respective standard errors give ratios higher than 2.116. The latter ratio was obtained for the comparison between adults and children and may be considered significant statistically as it is equal to a level of significance of one per cent, or in other words there is one chance in a hundred that the observed difference will occur by chance.

Table 5 shows the percentage of items marked consistently. These

TABLE 5
PERCENTAGE OF CONSISTENT RESPONSES, SECOND EXPERIMENT
"How I Feel" Inventory

		Mean	SD	Range
158 Children	Part I	80.4	9.47	40-95
	Part II	86.6	10.46	40-100
110 Adolescents	Part I	84.4	7.95	50-100
	Part II	90.1	9.02	50-100
132 College Students	Part I	87.4	7.74	60-100
	Part II	92.8	6.79	65-100

means for each part of the Test show a consistent increase from the lower age levels to the higher. For Part I of the test the mean consistency score increases from 80.4 for the children to 84.4 for the adolescents, and then to 87.4 for the adults. Similarly for Part II the mean increases from 86.6 to 90.1 and 92.8. The ratios of the differences between any two means of the three groups to the standard errors of these differences are all higher than 2.6.

A distribution was made of the differences in total raw scores be-

tween the first and second trials of Parts I and II of the test. For example, the range of total score differences from first to second trial on Part I for adults was -4 to $+6$; while the range of total score differences for children was -8 to $+7$. A comparison was made of the combined frequencies of the differences in total scores (second trial score minus first trial score) of $+1$, 0 , and -1 for Parts I and II. It was found that the per cent of differences of $+1$, 0 , and -1 for adults was 60 per cent, for adolescents it was 51 per cent, while for children it was 42 per cent.

Two other methods of comparing the three groups of subjects have been employed. Coefficients of variation and percentage of overlapping have been computed. The former are given in Table 6,

TABLE 6
COEFFICIENTS OF VARIATION OF PERCENTAGE OF CONSISTENT RESPONSES

Subjects	Mean, Part 1 & 2	S/D Part 1 & 2	Coefficient of Variation
158 Children	83.5	12.25	14.67
110 Adolescents	87.3	10.26	11.75
132 College Students	90.1	8.63	9.57

which shows that for the 158 children the mean consistency score, when the consistency scores for Parts 1 and 2 were combined is 83.5 with a sigma of 12.25 and a coefficient of variation of 14.67. Using the coefficient of variation for the children as a base, we find that the adults are only 65 per cent as variable as the children, while the adolescents are 80 per cent as variable as the children.

The percentage of overlapping technique suggested by Tilton (5) has also been used. We find that the percentage of overlap between the children and the adolescents is 83 per cent, between the adults and the children 71 per cent, and between the adults and the adolescents 84 per cent.

C. CONCLUSIONS

Our two experiments both indicate that consistency of response to personality questionnaires increases slightly with age, defining consistency as the marking of items in the same way after a two weeks' interval. This conclusion is not to be interpreted as meaning that school children are inconsistent in their responses to such questionnaires. They are not. For 71 per cent of the children had consis-

tency scores that could be found in the adults' distribution of consistency scores of corresponding magnitude. Moreover, though 60 per cent of the adults had score differences of ± 1 , 0, and -1 from trial to trial, there were 42 per cent of the children who also achieved this standard of consistency.

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INFERIORITY ATTITUDES AND THEIR CORRELATIONS AMONG CHILDREN EXAMINED IN A BEHAVIOR CLINIC*1

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Inferiority attitudes or feelings as a clinical description first appeared in America about 25 years ago under the name of "organ inferiority" with the publication of Adler's *Study of Organ Inferiority and its Psychological Compensation* (4). The late Alfred Adler with his medical and psychoanalytic background at first seemed to consider the patient's actual physical or anatomical inferiority to be the most potent cause of mental reactions and "compensations," but soon modified or enlarged the concept to include constitutional and mental inferiorities and social and cultural factors. The trend of recent writings has been to assign less causal importance to the actual physical and other objective conditions and to stress the importance of social pressures impinging upon the given individual. This change in emphasis, i.e., that inferiority may be largely a "state of mind," seems to be supported by the study about to be described in so far as the limitations of this research may warrant specific interpretations.

Recent writers have expressed themselves as follows. Louttit (5, pp. 455-460) writes:

Inferiority feelings develop only when the child, in comparing himself in any fashion—physically, mentally, socially—with people about him believes he is not their equal. In point of fact, he may not be [their equal], at least in the field of comparison. On the other hand, the child's belief may have no basis in objective circumstances. . . . It is doubtful whether the child of significantly retarded mental ability recognizes his inferiority and is affected by it.

Stagner (8, p. 271) writes: "Of the dull student is it particularly

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true that we need hypothesize no innate tendency to a feeling of inferiority; his teachers will put the idea into his head soon enough!" Thus Stagner recognizes that it is the criticism by others, whether real or implied, i.e., the factor of social pressure, which provokes the emotional reaction.

In his recent text Kimball Young (9, pp. 390-392) writes:

The lack of expected intelligence or of special talent may serve as the original stimulus for the development of a sense of inadequacy. When a child does not measure up in intellectual performance to the aspirations or ideal aims laid down for him by his parents or teachers, he may easily acquire—and largely from their attitudes and comments about him—an abiding sense of inferiority. . . . The discrepancy between aspiration and achievement in this field is a distinct factor in children's maladjustments in school. . . . A sense of inferiority may also develop in otherwise competent children in the course of their social and emotional training within the home and in other primary groups.

Maslow and Mittelmann in their recent text (7, pp. 23-25) place even more emphasis upon the social and cultural dynamics in the genesis of inferiority attitudes:

But we now know that . . . [the influence of organic inferiorities, e.g., being crippled, ugly, blind, deaf, or malformed, upon personality] . . . is rather an indirect effect which is intermediated by various cultural-psychological dynamic processes. It is not sufficient to say, "I have lost a leg, therefore I feel inferior." Now we would say, "I have lost a leg. In my society, people look down upon or pity or resent those who cannot make their own way economically, or those who are handicapped personally or socially. I recognize this loss of prestige and respect from others. Because of this I tend to lose respect for myself. Also, since I myself am a member of my society and share their beliefs, I feel toward myself as others do toward me." In other words, an organic inferiority leads to a feeling of inferiority only when this organic change is *defined by the society* as an "inferiority" . . . It is the cultural definition of a biological fact that will create the importance or unimportance of this biological fact as a psychological determiner of personality.

The present research was a statistical or "actuarial" study of the correlations of the notation *inferiority attitudes* with about 120 traits or conditions noted among 2,113 white boys and 1,181 white girls

examined consecutively at the Illinois Institute for Juvenile Research. Of these, 202 boys and 62 girls were noted by the staff as manifesting *inferiority attitudes*. These were children who have attended school and whose ages ranged from 6 years through 17, with means of about 12 years and standard deviations of about 3 years. Their *IQ*'s ranged from 50 to about 150, with means of about 82 and standard deviations of about 17. Our truncating the distributions at 6 years and at 50 *IQ* was advisable because the inclusion in our populations of many preschool children and mental defectives who have relatively few behavior notations tended to enlarge the correlation coefficients to a misleading extent. It cannot be asserted, on the other hand, that this clinic population thus truncated approximates an unselected representative population of children and adolescents of these ages. It is not safe to conjecture whether our correlations are higher or lower than those which would be obtained upon an ideal unselected population. On the one hand, a probable differential completeness of the case-record data would tend to "inflate" the correlation coefficients computed upon them; on the other hand, a probable "restriction of range" in this population would tend to lower unduly the magnitude of correlation coefficients. Correlation coefficients, like all statistical measures, must be interpreted in terms of the populations upon which they are calculated. Their application to unselected children must be made only in relative terms.

Our justification for employing case-record data is that at this time there exists little other material of similar comprehensiveness to be found upon groups of "unselected" children. Because of the practical difficulties in the way of obtaining dependable intimate case data from the child's parents except upon children examined in a children's behavior clinic it seems likely that for some time to come we must derive information as best we can from this sort of data despite its scientific limitations.

These children were typical of the intake of the usual child guidance clinic supported by public funds—in this instance by the State of Illinois. They were referred from a number of sources: the schools, charitable agencies, by family physicians, and frequently by the parents themselves. Among the reasons for referral were (a) poor work or retardation in school; (b) suspected mental defect; (c) enuresis; (d) conduct problems such as disobedience, truancy, or

stealing; (e) and personality difficulties such as restlessness, "nervousness," unhappy appearance or manner, daydreaming, and the like. All children were given an extensive examination by a staff composed of a psychiatrist, pediatrician, psychologist, psychiatric social worker, and also frequently a recreation worker. The information was usually given by the child's mother, and occasionally by the father or another relative, and sometimes by the child's teacher.²

The notation of *inferiority attitudes* in our data was always a staff notation usually made on the responsibility of the staff psychiatrist after formal examination of the child. For several weeks during the time these children were examined, the late Dr. Alfred Adler of Vienna was himself a guest member of the Institute staff. It may be assumed, then, that the notation was made with considerable carefulness, and was not a mere superficial conjecture made by a "lay" person.

Unfortunately it was not possible to compute "reliability" or "objectivity" correlations upon our data, a procedure which should be a prerequisite in all well-made researches. A scrutiny of the case records indicates that the parents' and teachers' information, especially when reviewed by the psychiatric social worker, who is trained in interviewing of this type, is usually correct so far as overt behavior of the children is concerned.

In the Table 1 are the correlations of *inferiority attitudes* with about 100 traits or conditions noted in the case records. (An additional score of similar notations showing low or negligible correlations are not included here.) The coefficients are Pearson's tetrachoric or bi-serial correlations, with age "partialled out." (The partialing-out of age made little change in the coefficients since age was correlated only negligibly with the behavior traits in our study.)

The relatively high bi-serial correlations of .43 to .62 and .59 to .63 among boys and girls respectively with *personality-total* indicates that an inferiority attitude is an important indicator of the extent of a child's personality problems (3). The *personality-total* is the total number of personality problems noted for a given child, such as *daydreaming*, *crying spells*, *seclusiveness*, etc. (In such a correlation, the item in question was omitted from the "total" so that this coefficient represents the bi-serial correlation of *inferiority attitudes* with

²A more extensive description of the case material may be found in (1, 2).

TABLE 1

Correlations of staff notation or question of inferiority attitudes with	Boys	Girls
	(N=2113)	(N=1181)
Personality-total (bi-serial <i>r</i>)	.43±.02	.59±.03
Conduct-total (bi-serial <i>r</i>)	.26±.02	.25±.04
Police arrest (tetrachoric <i>r</i>)	.04±.04	-.02±.06
Larger correlations (tetrachoric <i>r</i>) ranging from .30 to .50 among both sexes		
Sensitiveness or warriomeness (in general)	.49±.03	.50±.05
Sensitiveness over some specific fact or episode	.49±.03	.50±.05
Object of teasing by other children	.38±.03	.30±.07
Depressed or unhappy appearance or manner	.37±.04	.38±.06
Hatred or jealousy of sibling	.36±.05	.43±.08
Worry over some specific fact or episode	.35±.07	.33±.09
Daydreaming	.31±.04	.37±.07
Other correlations (tetrachoric <i>r</i>)		
Staff notation of mental conflict	.53±.04	.20±.09
Unpopularity	.29±.05	.29±.08
Boastful or "show-off" manner	.28±.04	.28±.08
Queer behavior	.27±.05	.28±.08
Seclusiveness	.23±.04	.48±.06
Bashfulness	.21±.05	.32±.06
Quarrelsomeness	.20±.04	.21±.06
"Nervousness"	.17±.05	.32±.06
Masturbation	.24±.03	.11
Sex delinquency (coitus)	.15	-.09
Neurological defect (unspecified)	.06	.22±.07
Underweight condition (10% or more)	.15	.09
Enuresis (present or former)	.15	.10
Question of encephalitis	.00	.01
Fits (present or former)	-.16	.08
Former convulsions	-.08	.08
Intelligence quotient (IQ), (bi-serial <i>r</i>)	.22±.02	.18
Age (CA), (bi-serial <i>r</i>)	.10	.07
Question of hypophrenia	-.06	-.07
Retardation in school	-.11	-.21±.05
Poor work in school	.17	.23±.05
Speech defect (unspecified)	.09	.02
Stuttering or stammering	.16	—
Mentally-defective sibling	-.09	-.33±.07
Vicious home conditions	.05	-.27±.08
Immoral home conditions	.02	-.01
Discord between parents	.08	.08
Brother in penal detention	-.03	-.14
Loitering or loafing	.01	-.24±.08

Correlations (tetrachoric-*r*) in the .20's among boys and below .20 among girls: temper display (not "tantrums"), bossy manner, rudeness, laziness,

lying, question of change of personality, "spoiled" or over-indulged child, and staff notation of psychoneurotic trends.

Correlations (tetrachoric- r) in the .20's among girls and below .20 among boys: *fighting, violence, defiant manner, contrariness, irritable temperament, restlessness, restlessness in sleep, irregular sleep habits, distractibility, changeable moods or attitudes, crying spells, apprehensiveness, finicky food habits, inefficiency in work or play, absent-mindedness, repressed manner, and overinterest in sex matters.*

Correlations (tetrachoric- r) falling between $\pm .20$ for both boys and girls: *stealing, incorrigibility, disobedience, stubbornness, swearing or bad language, temper tantrums, destructiveness, leading others into bad conduct, bad companions, staying out late at night, selfishness, staff notation of egocentricity, fantastical lying, truancy from home, truancy from school, refusal to attend school, disturbing influence in school, sulkiness, sullenness, staff notation of unfavorable conduct prognosis, listlessness, lack of initiative, slovenliness, irresponsibility, excuse-forming attitude, over-suggestibility, slow or dull manner, preference for younger children as playmates, lack of interest in school, inattentiveness in school, irregular attendance at school, exclusion or suspension from school, staff notation of emotional instability, nail-biting, "headaches," leader, follower, attractive manner, clean appearance and habits, popularity, and sex misbehavior denied entirely.*

the total number of personality difficulties noted for the child other than *inferiority attitudes*.) Its low but statistically significant correlations of $.26 \pm .02$ and $.25 \pm .04$ among boys and girls respectively with the *conduct-total* indicates that children with a staff notation of *inferiority attitudes* are likely to manifest a larger number of undesirable conduct traits, such as *lying, stubbornness, fighting, etc.*, than children without such a notation among our behavior-clinic population. This finding is curious in view of the fact that in our data the correlations with single conduct notations and also with *police arrest* or *penal commitment* were for the most part low or negligible, as can be seen in other portions of the table.

Tetrachoric correlations ranging from .30 to .50 were found for the following personality traits: *sensitiveness and/or worrisomeness in general, sensitiveness and/or worrisomeness over some specific fact or episode, depressed or unhappy appearance or manner, and day-dreaming.* These correlations perhaps represent little more than might be expected for symptoms of the same complex or constellation, and thus probably add little to an etiological understanding. Perhaps the same may be conjectured for *mental conflict* (a formal staff notation) with its tetrachoric correlations of $.53 \pm .04$ and $.20 \pm .04$ for boys and girls respectively.

The relatively substantial tetrachoric correlations ranging from .29 to .43 for *inferiority attitudes* with *object of teasing by other chil-*

dren, *unpopularity*, and *hatred or jealousy of sibling* may have etiological implications, since these three notations are commonly believed to be potent causes of inferiority. In these items one may believe that the dynamics are social rather than any actual condition of inferior status existing within the child himself.

The correlations ranging from .20 to .28 for the two notations *quarrelsomeness* and *boastful or "show-off" manner* lend support to the common belief that these may often be "compensatory" behavior. On the other hand the view that *police arrest* or *juvenile delinquency* may occur as a compensation or "aggression" for feelings of inferiority finds no confirmation in our statistical appraisal since this notation yielded only zero correlations with *inferiority attitudes*.

It is possible also that the three notations *seclusiveness*, *bashfulness*, and *daydreaming* with low to moderate correlations ranging from .21 to .48 may be considered as lending support to theory, especially among girls, on the ground that they represent a retreat or escape from inferiority-producing social contacts.

The tetrachoric correlations of $.17 \pm .05$ and $.32 \pm .06$ with the vague notation "*nervousness*" cannot be profitably interpreted. This notation was a frequent description given by parents in about 16 per cent of the cases in this study, but a scrutiny of the case-records yielded little indication of what behavioral configuration was in the informant's mind.

With *masturbation* among boys the tetrachoric correlation with *inferiority attitudes* was of moderate size and statistically significant, $.24 \pm .03$. Among girls this correlation was negligible. The correlations among both sexes with *sex delinquency (coitus)* were negligible.

Concerning six physiological conditions which presumably might cause inferiority reactions, the only statistically significant correlation among the 12 coefficients was the barely significant one of $.22 \pm .07$ with *neurological defect (unspecified)* among girls. For underweight or "*undersized*" condition (10 per cent or more from the age norms) and for *enuresis beyond third birthday (present or former)*, frequently cited as potent causes, the tetrachoric correlations though positive were too low to be of statistical significance upon our clinic populations of 2,113 boys and 1,181 girls among whom 202 boys and 62 girls were formally noted by the professional staff as manifesting

inferiority attitudes, the coefficients ranging from .09 to .15. Theoretically it is possible that zero-order correlations as low as .15 if statistically reliable are of interest, and it may be that clinical practice must take cognizance of relationships this low, but in any event we are safe in concluding that the relationship must be low indeed if it cannot be statistically demonstrated on populations of 1,000 or 2,000 cases. For the three notations *diagnosis or question of encephalitis (present or former)*, *lues (present or former)*, and *convulsions (present or former)* the tetrachoric correlations were negligible, ranging from —.16 to .08.

With intelligence quotient (*IQ*) as obtained from the Stanford-Binet of 1916 the bi-serial correlations of .22 ± .02 and .18 among boys and girls respectively were *positive*, though low. This finding is contrary to the frequently expressed belief, especially of many years ago, that mental defect was in itself a source of inferiority reactions. It must be remembered that the coefficients cited above were calculated upon a population in which *IQ*'s below 50 were excluded. If the lower *IQ* groups are included, the bi-serial correlations are larger (2). Among 1,513 younger white boys and 809 girls of all *IQ*'s aged 5.0 to 12.9 years of whom 116 boys and 34 girls had a notation of *inferiority attitudes*, the bi-serial *r*'s with *IQ* were .30 ± .03 and .17 ± .05 respectively. Among 1,014 older boys and 689 girls aged 13.0 to 17.9 years among whom 94 boys and 31 girls had notations of *inferiority attitudes*, the corresponding bi-serial *r*'s were .23 ± .04 and .28 ± .05. In fact, among 367 of our cases with *IQ*'s below 50, chiefly imbeciles, there was only one instance of *inferiority attitudes*, i.e., 0.3 per cent, as contrasted with 274 instances among 3,658 children with *IQ*'s of 50 or higher, i.e., 7.5 per cent. The highest incidences in our clinic population seemed to occur in the ranges above 90 *IQ*, but unfortunately our cases do not include enough very high *IQ* children to ascertain reliably whether intellectually superior children were more prone to inferiority reactions as some workers believe. But our statistical evidence, so far as it goes, indicates that mental deficiency seems actually to be a preventive of inferiority feelings.

With *question of hypophrenia or suspected mental deficiency or inadequate intelligence* the tetrachoric correlations of .06 and .07 for boys and girls for *inferiority attitudes* were of negative sign but of negligible size. These correlations do not contradict the implications

of the preceding paragraph that *inferiority attitudes* are negatively correlated with mental deficiency but our number of cases was too small to establish even the sign of the coefficient. This notation of *suspected mental deficiency or inadequate intelligence* must not be considered the "reverse" of intelligence quotient, in view of the fact that their intercorrelations (bi-serial r 's) were only $-.57 \pm .02$ and $-.53 \pm .02$ for boys and girls respectively (1). This was not a staff notation, but denotes a "lay" query expressed by a parent, teacher, physician, employer, or a social agency not equipped with a professional staff competent to render a formal diagnosis. In some instances the notation refers not to an absolute mental deficiency but to an "inadequate" intellectual level for the school grade or employment in which the child or person finds himself. For example, one child with this case-record notation actually was found to test at 125 IQ .

Speech defect (unspecified) other than stuttering yielded negligible tetrachoric r 's of .09 and .02 among boys and girls respectively upon our data, despite widespread emphasis among clinicians of its importance as an etiological factor in inferiority feelings. The positive correlation of .16 with *stuttering or stammering* among our boys, though not statistically significant upon our data, may be more meaningful. (The corresponding coefficient among girls was not calculated because of paucity of girls' cases.)

Retardation in school (which would amount to two years or more by the "school-leaving age" of 16) showed the high negative bi-serial correlations of $-.70 \pm .01$ and $-.70 \pm .02$ with IQ among boys and girls respectively (1). Contrary to a frequently expressed view, its tetrachoric correlations with *inferiority attitudes* were *negative*, $-.11$ among boys and $-.21 \pm .05$ among girls. While the boys' correlation is not statistically significant, the girls' correlation indicates that girls retarded in school are significantly more free from *inferiority attitudes* than are their more successful fellow pupils. With *poor work in school* the tetrachoric correlations of .17 and $.23 \pm .05$ were *positive*, and among the girls statistically significant. This notation is not closely related to IQ , the bi-serial r 's in our data being only $-.06$ and $-.13$. It undoubtedly represents a situation in which social pressures may be operative.

Among several home or familial conditions which presumably would induce inferiority feelings, it is curious that the only two

correlations (tetrachoric) of statistical significance, both among girls' cases, are *negative* in sign: *mentally-defective sibling*, $-.33 \pm .07$, and *vicious* (not "immoral") *home conditions*, $.27 \pm .08$. *Discord between parents*, *immoral home conditions*, and *brother with police arrest or penal detention*, all of which are frequently believed to be sources of inferiority feelings among children, showed only negligible tetrachoric correlations ranging from $-.14$ to $.08$ among both boys and girls. The fact of unfavorable home or familial status *per se*, then, does not seem to engender *inferiority attitudes*. In fact, the tendency toward *negativeness* among this group of coefficients suggests that these unfavorable notations actually are associated with a *freedom* from inferiority attitudes. One may conjecture a social or sociological interpretation based upon the absence of a disturbing "level of aspiration" under conditions such as these, but time does not permit further consideration of this possibility.

The statistically significant negative correlation of $-.24 \pm .08$ between *inferiority attitudes* and the notation *loitering*, "*bumming*," *loafing*, or *wandering* among girls defies interpretation. The correlation of this notation with *IQ* was negligible, the bi-serial *r*'s being .01 and $-.13$ among boys and girls respectively.

With a large number of aggressive conduct difficulties, as listed in the remainder of the table, the tetrachoric correlations were low or negligible. There is no strong evidence from our data that aggressive behavior is likely to be an over-compensation for feelings of inferiority, unless perchance the compensation is so thoroughgoing that not even a professional clinic staff is able to detect any such mechanism or process.

How should the correlation coefficients of this study be evaluated? In the entire correlational study of children's behavior problems, of which this paper is a part, some 7,000 correlations, mostly tetrachoric and bi-serial, were computed upon 2,113 boys, and another corresponding 7,000 ones upon 1,181 girls. Correlations upon this case-record material as high as the .50's and .60's were so infrequent that relatively they may be described as "high." Correlations in the .40's also were so conspicuous because of their infrequency that relatively they may be considered "large." Correlations in the .30's may be considered as "substantial," and those in the .20's as "low" or "moderate," but not negligible. The major portion of these 14,000

coefficients were indeed very low or negligible, with values lying between .20 and —.20. Among the more familiar pencil-and-paper test scores in mental and educational measurements one easily obtains correlations ranging from the .60's to the .80's. In clinical case material it is probable that values in the .30's or .40's is about as much as may be expected for zero-order correlations between any two actual traits or conditions. It is probable that workers in a behavior clinic are thinking in terms of elementary relationships of this magnitude. The successful diagnostician is probably one who can integrate a multitude of such relationships based upon a many-sided examination of the child and by a noetic process akin to the laborious statistical methods of partial and multiple correlation and regression can arrive at appropriate interpretations and recommendations.

It may be concluded (a) that physical, mental, and social conditions of objective inferiority do not *per se* give rise to inferiority attitudes; (b) that higher intelligence tends to be associated with inferiority attitudes; and (c) that traits or conditions in which social pressure may be operative are more likely to be associated with inferiority feelings. Our data unfortunately do not enable us to proceed to investigate directly the effect of this social pressure. One can hope that intensive studies of social and cultural milieu with their consequences in "goal-ideas" and "levels of aspiration" may presently be extended to broad problems of gross human personality and behavior.

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NOSTALGIA: A DESCRIPTIVE AND COMPARATIVE STUDY*¹

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A. THE PROBLEM

Articles on nostalgia are rare and none, to my knowledge, report a systematic and controlled investigation. It was with the hope of contributing something of scientific value that this investigation was undertaken. The major problems considered are: symptomatology, personality, etiology, theoretical interpretation, prevention, and treatment. Homesickness is defined as a longing for home of sufficient intensity to cause unhappiness and to be recognized as homesickness by the individual and his associates. Home is interpreted as any former location or situation.

One hundred college students who were or who recently had been homesick were compared with 100 college students who never had been homesick while away from home. Each group was equally divided as to sex, and the sex groups were equally divided as to membership and non-membership in a social fraternity or sorority. The Homesick and Non-homesick Subjects were paired for sex, age, *American Council on Education Test scores*, year in college, and membership or non-membership in a social fraternity or sorority. Due care was used in selecting the Subjects and in impressing upon them the necessity for absolute honesty. A checking system was used which made it unnecessary for the Subjects to sign their names to the questionnaires. Comparisons were made on the basis of the *Bernreuter Personality Inventory*, the *Conklin Extravert-Introvert Interest Questionnaire*, 186 questions on symptomatology, etiology, prevention, and treatment, and on certain data obtained from the Registrar.

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¹This paper was read at the 1940 meeting of the American Psychological Association at Pennsylvania State College, State College, Pennsylvania.

²The details of this study are on file in the library of Indiana University. For a bibliography see: (1). This research was done at Indiana University and was under the general supervision of Professor Edmund S. Conklin.

B. THE DATA

1. *Symptomatology*

The variety of symptoms listed by the Homesick Subjects was as great as the number of Subjects answering the questions. The symptoms, however, fell into the following four major types: (a) Unpleasant physiological sensations, such as "a strange hollow feeling in the pit of the stomach," "a lump in the throat," and "a strange tightening inside." Fourteen per cent of the girls and 16 per cent of the boys included symptoms of this type. (b) Feelings of depression and despair, such as feeling "blue" and lonely, feeling that everything has gone wrong, and feeling that something terrible is about to happen back home. Sixty-six per cent of the girls and 52 per cent of the boys included symptoms of this type. (c) Unsatisfied longings and desires, such as longing to be home, or to see someone from home. Forty-eight per cent of the girls and 48 per cent of the boys included symptoms of this type. (d) Inadequate substitute reactions for return home, such as constant communication with home, thinking and talking about home, and dreaming and daydreaming about home. Twenty per cent of the girls and 22 per cent of the boys included symptoms of this type. One girl and four boys were unable to describe how they felt when homesick. The onset of symptoms ranged from very gradual to sudden, and their duration varied from a few minutes to several weeks.

The variety of symptoms makes a specific symptomatology for homesickness impossible, but all the symptoms indicate that homesickness is emergency emotional behavior. All emergency emotional behavior, however, is not homesickness. What it is depends upon its emotionally charged core. If the core is a longing for one's lover, the behavior is lovesickness; if it is a longing for a deceased person, it is grief for the dead; if it is a desire to return home, it is homesickness. If a group of emotionally invested ideas of home should be present in the individual's psychological repertoire without the individual being consciously aware of it, such a group of emotionally toned ideas would be a complex and could properly be called a *nostalgic complex*.

2. *Personality Traits*

Personality traits were compared on the basis of the Bernreuter

Personality Inventory and the Conklin *Extravert-Introvert Interest Questionnaire*. Standard scoring methods were used, and differences in mean scores were considered significant only when the critical ratio was 2.00 or greater. All six scales were applied to the Bernreuter *Personality Inventory*, and all scores were within normal limits.

a. *B1-N scale*. A high score on this scale indicates emotional instability. The Homesick Group made significantly higher scores than the Non-homesick Group. Critical ratios were 3.03 for the girls and 2.44 for the boys.

b. *B2-S scale*. A high score on this scale indicates self-sufficiency, and a tendency to ignore the advice of others. The Non-homesick boys made significantly higher scores than the Homesick boys, the critical ratio being 2.40. The difference in mean scores for the girls was not significant.

c. *B3-I scale*. A high score on this scale indicates introversion and a tendency to substitute daydreaming for action. The Homesick Group made significantly higher scores than the Non-homesick Group. Critical ratios were 3.61 for the girls and 2.42 for the boys.

d. *B4-D scale*. A high score on this scale indicates a tendency to dominate others in face-to-face situations. The difference in mean scores was not significant for either the boys or the girls.

e. *F1-C scale*. A high score on this scale indicates self-consciousness and feelings of inferiority. The Homesick boys made significantly higher scores than the Non-homesick boys, the critical ratio being 2.43. The difference in mean scores was not significant for the girls.

f. *F2-S scale*. A high score on this scale indicates a tendency to be non-social, solitary, and independent. The difference in mean scores was not significant for either the boys or the girls.

The difference in mean scores made on the Conklin *Extravert-Introvert Interest Questionnaire* was not significant for either the boys or the girls.

The traits characteristic of the Homesick Group are probably predisposing to homesickness.

3. *Etiology*

Nowhere in the data is there evidence of a specific factor or group

of factors in the absence of which homesickness will not occur and in the presence of which homesickness is inevitable. On the contrary, the causes of homesickness appear to be unlimited in their number and relative in their effect. The factors listed here are of etiological significance because they occurred among the Homesick Subjects significantly more frequently than among the Non-homesick Subjects the critical ratio of the difference in percentages being 2.00 or greater.³

a. Girls. Probable predisposing factors for the girls are: extreme fondness for home, for people and social functions, and for the home community; keen mental imagery of home surroundings whenever the word "home" is heard; the habit of confiding in one's family and depending upon their advice and guidance; and a strong feeling of belonging to and sharing in one's home.

Probable precipitating factors for the girls are: being away from home for the first time; monotony and boredom; loneliness; severe rules and restrictions; disappointment; disillusionment; dissatisfaction with one's room at college, and with college life in general; insecurity; discouraging communications from home; and unhappiness.

b. Boys. Probable predisposing factors for the boys are: extreme fondness for the companionship, help, and love received at home, for the family, and for the home community; being accustomed to receiving many scholastic honors in high school; having a home town sweetheart; thoughts about one's father or about one's home town sweetheart whenever the word "home" is heard; seldom being alone while at home; infrequent visits away from home; feeling that there is an inter-dependence among the members of one's family; difficulty in getting acquainted with girls at college; and irregular hours for recreation.

Probable precipitating factors for the boys are: monotony and boredom; loneliness; disappointment; disillusionment; snobbishness of others; discouraging communications from home; and unhappiness.

³These questions were scored according to formulas and tables given by Edgerton, H. A., and Patterson, D. C., "Tables of Standard Errors and Probable Errors of Percentages for Varying Numbers of Cases," *J. App. Psychol.*, 1926, 10, 378-391.

4. *Factors Helping to Prevent Homesickness*

The following factors are believed to help prevent homesickness because they occurred among the Non-homesick Subjects significantly more frequently than among the Homesick Subjects, the critical ratio of the difference in percentages being 2.00 or greater.

a. Girls. For the girls these factors are: frequent visits away from home; emotional indifference when visited by folks from home; infrequent visits home; cheerful communications from home; good study habits; satisfaction with college; new friendships; a good appetite; adequate sleep; activity; and the habit of solving one's own problems.

b. Boys. For the boys these factors are: frequent visits away from home; few communications with home; cheerful communications from home; indifference about spending one's life in the home community; happy relations with one's father; emotional indifference when visited by folks from home; finding it easy to get acquainted with girls in the new community; satisfaction with college; satisfaction with one's room at college; outdoor work; active participation in athletics; playing in dance bands; and not being limited by a scant budget.

5. *Factors Apparently Having No Role in the Etiology or Prevention of Homesickness*

The following factors are called non-effective factors because they occurred with about the same frequency among the Homesick and the Non-homesick Subjects, the critical ratio of the differences in percentages being less than 2.00.

Non-effective factors involving the home are: its location, whether in a city, town, village, or in the country; frequent changes in its location, whether local or distant; no changes in its location; distance from home; time required to reach home; size of the family; having both parents, one parent, no parents, or step-parents; domination of the home by either or both parents, by someone other than the parents, or by no one; home broken by death or divorce; clannishness of the members of the family; having a pet at home; wanting or expecting to live at home again; and being away from home longer than at any other time.

Non-effective factors involving the home community are: its in-

dustry; opportunities for young people to earn a living there; and degree of community spirit.

Non-effective factors involving the school and college situations are: age started to school; age started to college; type of school attended at home, whether city, rural, country, or consolidated, or whether religious or secular; borrowing or earning all or part of one's college expenses; holding a scholarship that pays part of one's expenses; working part time while at college; living with relatives while attending college; number of college hours and courses carried; taking required Military and Physical Education courses; grades and grade points earned; taking part in "Bull Sessions"; having all one's friends be from one's home community; and rooming with a person from the home community.

Non-effective factors involving religion are: church membership; denominational preference; church and religious activities; membership in the Y.W.C.A. or Y.M.C.A.

Other non-effective factors are: age; presence or absence of physical defects; being an only child, oldest child, youngest child, or a middle child; playing alone or with other children when a child; playing at home or away from home most of the time; playing with one's brothers and sisters most of the time; happy childhood memories; the experience of earning one's own spending money; camping experience; experience in leadership; reading the home town paper regularly; kind of recreation preferred; regular hours for meals, going to bed, getting up in the morning, and for studying; and having spent most of one's life in a city, town, village, or on a farm.

C. THEORETICAL INTERPRETATION

The author envisages nostalgia as an emergency emotional behavior pattern having as its physiological correlate the activation of the sympathetic division of the autonomic nervous system. The pattern is identified as homesickness rather than some other emotional up-set because it has as its core a strong, emotionally charged desire to return home. Emotional attachment to the home is acquired as a result of the individual's particular interbehavior with the home situation. This emotional component, which is nothing more than love for home, might be called the nostalgic sentiment.

When developed to an exaggerated degree its arousal by factors in the away-from-home situation causes the individual to be dominated by a strong emotionally charged desire to return home. Failure to return home thwarts this emotionally charged desire with the result that relief is sought through substitutes for return home. The failure of these substitutes creates a frustration circumstance which, in turn, arouses the emergency component with its various physiological and psychological symptoms.

D. PREVENTION AND TREATMENT

1. *Prevention*

For the prevention of homesickness one would do well to eliminate those factors which occurred significantly more frequently among the Homesick than among the Non-homesick Subjects, and to develop those which occurred significantly more frequently among the Non-homesick than among the Homesick Subjects. Emotional stability, self-sufficiency, self-reliance, friendliness, a wholesome interest in others, a sense of responsibility, a sense of humor, good manners, and many activities would come very near insuring immunity to homesickness. There should be no opportunity in the home situation for the development of an exaggerated emotional fixation to the home or to any part of the home situation, and the away-from-home situation should be made as pleasant as possible.

2. *Treatment*

Treatment refers to those practices which relieve homesickness. When asked what relieved their attacks of homesickness, the Homesick Subjects gave five types of answers. Forty-four per cent of the girls and 46 per cent of the boys stated that a short visit home helped them recover. Forty per cent of the girls and 66 per cent of the boys listed some form of non-religious activity, such as going out with friends, playing games, and studying. Thirty-six per cent of the girls and 14 per cent of the boys listed encouragement by friends. Twenty-two per cent of the girls and 16 per cent of the boys listed substitutes for return home, such as cheerful communications from home, and encouraging visits by relatives and friends from home. Six per cent of the girls and 6 per cent of the boys stated that they just let the feeling wear off.

The specific for homesickness is, of course, return home. However, when this is impossible, treatment can take the form of adequate substitutes for return home, such as cheerful communications from home. Also, treatment appears to be anything that reduces or sublimates the emotionally charged desire to return home, or that arouses counter emotions, such as many activities, excitement, anger, success, and falling in love with someone in the new community.

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DIRECTIONS FOR ADMINISTRATION OF THE RORSCHACH GROUP-TEST*†

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A. INTRODUCTION

The information to be found here is not a set of directions in the ordinary sense of the term. We are well aware that this single experimental study (pushed through under pressure to meet the requirements of an unusual situation) cannot be expected to have yielded a technique which admits of no improvement. A detailed description of our procedure, however, will allow those who wish to make certain alterations to have a basis of comparison for the variables which they introduce.

B. MATERIALS USED

1. *The Slides*

The reproductions of the Rorschach cards were made for our use by Mr. H. S. Hayden, F.R.P.S. Cards *II*, *III*, *VIII*, *IX*, and *X* were made on Kodachrome cut film; Cards *I*, *IV*, *V*, *VI*, and *VII* on Ilford lantern plates. The colored films were processed in Rochester, New York, and the black and white ones in Montreal. While no trouble was encountered with the colored slides, it was found that the black and white slides offered certain difficulties. Minute differences in shading, imperceptible to persons not familiar with the cards, gave a wrong "flavor" to the slide in question. Slide *VII*, for example, if slightly too dark loses all its "cloudiness." It was therefore necessary for the experimenter to check each slide very carefully and sometimes to discard as many as 10 attempts before a faithful reproduction of the card in question was achieved. The final set used in our experiment has been taken as the "standard" set and the 58 additional sets which have been made to date have been carefully equated with the original one. We would suggest, therefore, that if

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comparable studies are to be made, slides should be obtained from the author.

At the present time we ourselves are experimenting with a new and smaller type of slide, namely, the 35mm roll film. These slides are projected in the small Kodaslide machines. If the colors of the Rorschach cards and the nuances of the grays can be reproduced as accurately on the small film, then there would be definite advantages for its standard usage. The slides would be considerably cheaper, easier to ship and carry, while the small Kodaslide projector would secure uniform conditions wherever it was used.

2. *Projector and Size of Image*

The projector used was a standard university lantern, the size of the image thrown by it being six feet by five feet in our particular set-up. This is an example of a point on which we do not wish to be dogmatic. It so happened that an image of this size was plainly visible to both the front and back rows in our particular auditorium. One is dependent to a large extent in such matters on the facilities available at the place where the research is carried out. In the auditorium which we used we left the projector unchanged, since this had already been located in the optimum position for that particular auditorium. Persons sitting nearest to the screen were 12 feet distant from it, and it is recommended that this distance should not be shortened otherwise a feeling of being "dwarfed" by the slides may result.

C. METHOD

1. *Lighting*

This phase of the work constituted somewhat of a problem. In order that the slides may be seen to the best advantage, the room or auditorium should be as dark as possible. On the other hand, of course, some light is necessary for the recording of responses. Our first idea was to use one dim light somewhere in the auditorium but we found rather to our surprise that the light from the slides themselves was sufficient to enable our subjects to write their responses. That this was possible may have been partly due to the fact that our auditorium is built up in tiers so that for no person was the light obscured by the individual in front of him. We therefore must em-

phasize that this was a condition which was possible in our auditorium but which perhaps would not be possible in others.

We tried out one variation but found it unsatisfactory. This was to switch the light off and on alternately for periods of 30 seconds, requesting observation during the dark period, and recording during the light period. Interestingly enough those subjects submitted to this variation unanimously requested to be allowed to write in the dark. Probably the best suggestion is to have one dim light available at the back of the hall, shielded so that it does not shine directly on the screen but bright enough to afford some guidance in the matter of recording. We always stressed the fact that handwriting need not be neat, and to our knowledge no difficulty arose in this connection. All answers, incidentally, were perfectly legible. When the slides were changed, the light in the projector was extinguished momentarily, thus contributing to, rather than lessening, the dark adaptation. This is a minor point, however, and it is quite possible that a momentary period of brighter light would have been a better interlude than the momentary total darkness.

2. *Time*

After considerable experimentation a three-minute exposure of each card was decided on. Time intervals shorter than three minutes were not long enough for the average subject. Intervals longer than three minutes were unnecessary except in a very few individual cases. If, however, there is no time limit to the experiment as a whole, there is no reason why more time might not be allowed to each card. One of the aims in this particular experiment was to see whether the whole test could be completed within approximately one hour, and having discovered that this was possible, we kept the total time constant for all our groups.

3. *Turning the Slides*

In the same way it might be said that if a longer total time is to be allowed, each slide might well be exposed for perhaps one minute in the reverse position in addition to the three minutes in the usual position. Our experience on this point, however, leads us to conclude that not enough was gained by this turning to justify the extension of the time limit we had set for the experiment. It is also interesting

to note that certain answers were given as if the cards had been turned, the subjects turning their heads so as to get the impression more clearly.

4. *Instructions*

It may be valuable at this point to outline in chronological order the series of events as they took place. When our subjects arrived in the auditorium they found in each place a pencil and the booklet in which the answers were to be recorded. A notice on the black-board stated: "*Do not open the booklets you will find on the seats.*" The examiner waiting in the front of the auditorium chatted informally with the subjects as they came in, calling attention to the notice on the board and to the pencils they would find together with the booklets. When all subjects were seated, the examiner mounted the platform, called for their attention, and the test proper began.

We have said in the paper describing this experiment that the instructions were similar to those given in the individual test. Perhaps it is well in this connection, however, to be more specific and to "dot all the i's." While no set formula was used, the proceedings opened with approximately the following statement.

The test in which you have been kind enough to participate is rather an amusing one and I think you will enjoy it. All you have to do is to look at some slides which will be projected on the screen and write down what you see. Now the point about these slides is that they are nothing more or less than reproductions of ink blots. Probably all of you at one time or another have shaken your pen on a piece of paper, caused a blot of ink, and on folding the paper produced a weird splotch which may or may not have resembled something that you recognized. Now these slides are nothing more than reproductions of ink blots formed in this way. Your task is simply to write down what these splotches remind you of, resemble, or might be. You will see each of these slides or blots for three minutes and you may write your answers at your own time. Is that understood?

After instructions about the nature of the ink blots, the booklets were described and explained. It was emphasized that a page should be turned each time the slides changed, that is, all answers to a given slide should be recorded on a separate page. It was re-emphasized that the flaps on either side of every page should not be turned until instructions were given for doing so.

The 10 slides were then shown in the usual order for three minutes each with a fractional pause sufficient only to insert the next slide. When the tenth slide had been shown for three minutes, the lights in the auditorium were all put on. The examiner again mounted the platform and after a few informal remarks continued somewhat in this vein:

Well, this is the first part of the experiment. Now we shall go on to the second. I'm sure you will have seen a lot of amusing and different things in these various ink blots, but one of the important aspects of this test is the fact that I must know as accurately as possible just what it is you have seen and where you have seen it. If you turn back the left hand flap opposite the first page where you recorded your answers, you will find a little diagram representing the slide. (At this point Slide I with various areas marked off on it was thrown on the screen and the examiner continued.) Now perhaps some of you saw on this particular slide a butterfly, and then perhaps you also saw the legs of some person in the center here, and perhaps a boxing glove in this little protuberance here or a dog's head here on the side. (While speaking of these objects the examiner showed with a pointer the areas referred to which were encircled by a dark line on the slide.) Your next task, therefore, is to number your own answers and then with your pencil to draw a line around the area where you saw it and attach to that area the number of the answer you are describing. For example, let us suppose you had seen just those four things which I mentioned. You would put a number 1 by 'a butterfly', draw a line all the way around the miniature ink blot and put 1 beside this line. If 'somebody's legs' was your second answer, you would number that 2, draw a careful pencil line around the area on the diagram and attach a number 2 to it. In other words you will do for all your own answers what has been done for these hypothetical answers on the screen.

After the instructions concerning the recording of the location of responses had been given, Slide *VIII* was thrown on the screen and the subjects told to look at the flaps on the right hand side of the page. Our instructions at this point were something of this sort:

Now before you begin to mark off your answers there is something else you have to do for me. You have to help me reconstruct as accurately as possible the kind of experiences you have been having, or some of the characteristics of the things you saw. You might, for instance, have seen two bears or two animals

here on the side. You might have seen two flags here in the center, or you might have called these same parts "two cushions". This part here (pink and orange) might have reminded you of some kind of flower. Now some of you may have said, for example, that the bears looked as if they were climbing up, but it is also very possible that you did not put in that last bit of information. Now is your chance to do so if you want to. In other words, if you want to explain to me that the animals you saw looked as if they were stepping from one rock to another, put the number of that answer under the words *movement* and *shape* on the right hand side of the page. But perhaps you did *not* see them as if they were stepping. Fine! That is just as important. Perhaps they looked to you as if they were some kind of animal on a heraldic design. In that case put the number of the answer under the word *shape* alone. Now let us suppose that you not only saw cushions here but saw *blue satin* cushions. In this case you would put down the number of the answer under *color*, *texture*, and *shape*. Why? Because they were the shape of cushions, because they were blue cushions, and because, just from looking at the ink blot, you got the impression of the satiny or silky *feel* of the cushion. Now this flower may have impressed you because it was the color of the sweet peas in your back yard. In that case put down the number of that answer under the words *color* and *shape*, and if the color is more important, or, shall we say, if it really was the color that attracted your attention and made you think of those sweet peas, put a ring around the number of the answer under the word *color* to show me that it was that in which you were most interested.

In our auditorium a large blackboard was located just under the screen. It was a very simple matter, therefore, as a final step in these instructions to write the four words on the board, take a few hypothetical answers, and show how these answers would have to be amplified in accordance with the foregoing discussion.

After the instructions had been given and after any pertinent questions had been answered, the slides were projected again in the usual order, each being shown for approximately two minutes. The word "approximately" is used here because it was easy for the examiner standing in front of the group to see when the subjects had finished this phase of their task. On some slides it was not necessary to wait for a full two minutes to elapse before going on to the next. During this period the lights in the room were on allowing for accur-

ate delineations of the areas, although the slides themselves were still clearly visible though perhaps not quite as brilliant as before.

5. *Scoring*

Our procedure in regard to scoring was first to read through the whole booklet of responses of any individual, then to score these responses slide by slide without reference to any additional information that might have been given by the subject himself. When this was done, we turned back the inquiry flap for each answer, comparing the information given by the subjects with the scoring we had arrived at by direct inspection of the answers. Finally with a group of 40 of our 110 subjects we gave an "Individual inquiry" on the answers obtained in the Group-test at the same time as the inquiry on their answers in the Individual test.

Perhaps the best way to illustrate what confronted us is to quote from some of the actual records. The ease with which answers could be scored varied considerably. There were, for instance, those answers which were extremely explicitly stated by the subject in the spontaneous recording, for example that by *Gi* to Card *V* quoted earlier, and many others. On the other hand there were answers which had to be taken at their face value—those to which conclusions had to be reached without much additional evidence. There were also responses which the subject could not or did not bother to amplify; for example, *cat* (to *I*) with the whole area delineated which meant, as a matter of fact, a cat's face.

In the following pages we have taken examples from the various determinants to illustrate the kind of material which was scored under the usual categories.

a. M. In general it must be said that *M* was not difficult to determine. Almost all responses which included human figures made explicit references to their movement or posture. For example:

Card III

"Two little men in old-fashioned evening clothes dancing or whirling around the floor opposite each other." (In this case both movement and color were indicated by the subject.)

"Two servants carrying a container full of fuel for the fire in the background." (Our scoring with *M* and an additional *CF* on this answer was verified in the Individual inquiry.)

Card II

"An oriental dance; two masked, robed figures clapping one hand and stamping their feet in unison." (Both movement and color were indicated by the subject and in the individual inquiry the color was revealed as relating to the caps. Our scoring on the basis of the Group-test alone had been *M* with an additional *FC*.)

Again on *II* we have such answers as: "Two witches doing a pat-a-cake dance around the fire." (Fire, lower red. An *M*, *CF* scoring was indicated by the subject and was verified in the individual inquiry.)

b. FM. Examples of *FM* as distinct from *F* may be found where the variations of the bat responses to Cards *I* and *V* have already been given. For example:

"A bat flying through the air."

"A bat gasping for breath."

"A bat about to stretch its wings."

"A bat poised for flight."

"A bat drawn on paper."

These show the various gradations of movement or the lack of it. Innumerable other examples could be given:

"Worms crawling" (in *X*).

"A couple of mice clinging to part of an ancient skeleton" (*I'III*).

"Two little animals trying to crawl on to a bough" (*I'III*).

Less explicit but also verifiable on individual inquiry are such answers as "chameleons" with movement and color marked, the individual inquiry revealing that the animals were "climbing up the side." And chameleons because only for such animals is pink legitimate.

c. m. Movement of inanimate objects, expressions, and "atmospheric impressions" were all found amongst our records. We scored as *m* or additional *m* such answers as:

Card VI

"Impression one might get of a rocket ship taking off from landing."

Card IV

"Torpedo leaving gun over black oily water."

Card IX

"Circular motion."

Card I

"Some threatening evil spirit."

Card V

"A strong but untrustworthy man's face" (*de*).

d. k. Good examples of this type of response have already been given. The repeated reference to *x*-rays called for a scoring of this kind. Similarly the well-known geographical answers, topographical and relief maps, were frequently found.

e. K. The majority of these answers were found in the cards *IX* and *VII*. They included clouds of all varieties, colored and uncolored, and were usually recorded by the subjects themselves as having been prompted by texture, or by texture and color.

Card IX

"Clouds in a sunset."

"Something poured into odd shaped bowls, comes out at the other end and gives off a colored vapor." (Movement, color, texture recorded.)

"Some sort of water jet with water spouting up in the middle."

"A volcano, it seems to be bubbling and boiling all around and the steam is just beginning to gush up. Suggests fire in its color. The center part seems quite thick." (Movement, color, and texture were all recorded.)

f. FK. As will be seen from the record booklets, we did not include "vista" amongst the words on the inquiry flap. It seemed to us, after the first trial booklet had been in use that this was unnecessary, for vista responses were as a rule stated explicitly. We record a few examples:

Card II

"Corridor leading to a throne with a canopy over the top" (*a drs* response).

Card III

"The red section in the middle resembles a corridor leading down to a door at the end."

Card VII

"I can practically see a long steamship passing through a very narrow canal" (*a d* response).

(All these responses were given by the same subject.)

The following examples are taken from another record:

Card IV

"A scene taken from a plane showing houses, hills, churches, ruins, lakes."

Card VI

"A tower built on a hill." (This answer, given again in the individual record and investigated in the inquiry, confirmed the expectation of the vista element.)

g. F. This category can be illustrated by such *de* answers as: "a face," "a man's profile," "an Indian's head," "a man's leg" and many other human details. There are also the "bat" responses where movement is explicitly denied or shape indicated as the only determinant, and many other objects which in the opinion of both the subject and the examiner are determined by shape alone.

h. Fc and c. Perhaps the categories concerning which there is most likelihood of confusion are the *Fc* and *c* scores. In the author's experience, however, these frequently present difficulties in Individual tests also. Some out and out *c* responses are not hard to determine, for example: "pelt," "hide," "skin" (to Cards *VI* and *IV* with texture alone recorded). Or again, "an open sore" (a *di* in *VI*), "a fungus growth" or "sponge" (Card *I*) or "dress material, some sort of soft goods" (Card *VIII*).

Nor are certain *Fc* responses difficult: "A thick twisted old Chinese pine tree" (to Card *IV*, texture and shape), "tabby cat's paw," "a lamb's tail," and "a turtle with its neck out and feathers around it."

However, "a leopard skin hung on the wall with some kind of totem pole in the middle" was scored as *W Fc* on the basis of the Group-test information, but the Individual inquiry leads us to re-score this in terms of two separate responses, *c* and *Fc*. A number of minor corrections of this kind could be referred to. Perhaps we can epitomize this by saying that while there seems to be no difficulty in discovering if shading was utilized, the weight that should be given to it is more difficult to assess in some cases in the Group method.

i. G'. The scoring of *G'* caused relatively few problems. Many subjects spontaneously utilized the word "color" on the inquiry flap, putting in brackets "black" in order to convey their impressions. For example:

Card I

"German imperial emblem" (marked for both movement and "black").

Card IV

"A black bearskin rug."

Card V

"A black bat."

Card VII

"A bright image between the mountains." (This was a white space response and was scored as "color" by the subject.)

There are also responses where "black" is not recorded but can easily be deduced as for example: "a cloud of smoke in the sky." Color is not recorded by the subject in regard to this answer but the Individual inquiry confirmed our suspicions that there was a *C'* element involved. Also scorable as *C'* are such answers as; "a central line and black and gray splash."

j. *FC*. While *CF*'s were probably one of the easiest determinants to score accurately in the Group method, *FC*'s presented at first somewhat of a problem. We hesitated to score an answer *FC* in the first 40 records taken by the Group method until Individual inquiry had re-inforced our original expectations. We soon found, however, that frequently the record in its entirety gave a clue to an answer which in itself might have been questionable. For example, in Card *II* Subject *RU* responds with "butterfly," giving the determinant as color. How is this to be scored? The answers of this subject to *VIII*, *IX*, and *X* give us useful information, for in these she shows herself capable of genuine *FC*'s which can be distinguished from her *CF*'s. Her answer to *VIII* is, for example, "a bowl with a plant in it, the two animals being a decorative part of the bowl" (*W*). In her opinion color was the most important determinant, but the form element is plainly visible. In the same way in *IX* and *X* she delineates areas as "a cactus leaf" and "a bloom" (the yellow in *X*). These same answers when repeated in the Individual records gave unmistakable evidence of the utilization of form.

There is no reason, therefore, to doubt that the form of the red butterfly was not accurately seen in *II*, thereby justifying an *FC* score. Neither is there any reason to suppose that *FC* is not the appropriate scoring for "two small caterpillars" (in *X*), nor for "a very majestic pine tree" (in *VIII*), "butterfly" (in the lower portion of *VIII*),

and such answers as "the cross section of a red tulip upside-down" (in *X*), "lobsters" (in *IX*), when color is claimed as significant by the subject.

k. CF. There were certainly no dearth of *CF* responses in our records. Here are some of the many examples:

Card II

"Red at the bottom looks like the disintegration of a comet."

"Coals in a lighted fire."

"Fire starting at the bottom."

"Picture of a bomb explosion."

Card VIII

"A forest fire."

"Lower part looks like the inside of a beef steak done rare."

"The colors remind me of the diagrams in biology of the circulatory system."

"A map, colors not shape."

Card IX

"Flames in a fireplace."

"Clouds in a sunset."

"Crude oil burning."

"Colorful chemical experiment."

"Surrealist art."

Card X

"An afghan."

"A colorful rock garden."

"A beautiful garden in Japan."

For all these responses the subjects themselves recorded the importance of color.

l. G. Color naming, color symbolism, and color comments also featured in the records.

Card IX

"Orange, then green with pinkish mass at the bottom."

Card II

"Two headless men kneeling before an altar, giving praise to some phenomenon, the color of which is red."

Color comment.

Card IX

"Something unpleasant; I don't like orange."

Card II

"Combination of two colors I don't like. I don't know why, though."

Card VIII

"The shade of blue and rose gives me a pleasant feeling. Reminds me of spring."

D. CONCLUSIONS

It is our opinion that the wider the experience of the Rorschach worker in general, the easier it will be for him to score his Group records satisfactorily. There will admittedly be cases where difficulties arise: the subject may have placed the wrong number under a given category, thereby making a nonsensical answer. Or again, there will be the occasional subject who seems determined to attribute every determinant to every answer. One must learn where to override the subject's information. While this may seem like a cheerful acceptance of a considerable number of inaccuracies, an interesting checkup can be made. Score a controversial record in the various alternative ways, and if occasion demands, give an Individual inquiry to the subject for all his answers. If our experience is any guide, it will be found that the essence of the record is preserved in either scoring, or rather, alternative scoring occurs only in regard to relatively minor points.

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MODIFICATION OF THE RORSCHACH METHOD FOR USE AS A GROUP TEST*†

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At a recent psychological meeting a report was given of a *mass psychiatric interview* for army personnel. The immediate reaction of the listeners to this information was, perhaps naturally, one of skepticism. Similarly, accounts of *mass psychotherapy* have evoked the feeling that while such an attempt may be possible and necessary under certain circumstances, it is at best a poor substitute for the genuine article.

I have assumed therefore, that the initial reaction to this proposed modification, particularly amongst those persons who have worked extensively with the Rorschach, will also be one of frank skepticism. Having approached the problem myself somewhat in that frame of mind, I feel that I should now state my belief that not only can the Rorschach method survive such a drastic modification, but that in its new form it offers us just as valid a tool for estimating certain aspects of personality as does the usual or Individual procedure. And while it obviously will not and should not supplant the Individual method, it has great advantages where a very large number of subjects are to be examined in that it is enormously time-saving.

Our modified procedure, spoken of from now on as the Group method as distinct from the "Individual," involved the projection of slides of the 10 Rorschach cards on a screen, five by six feet, in a darkened room.

The subjects, generally in groups of 20 (but far larger groups could be handled) sat in the center section of our auditorium, all facing the screen squarely. The first row was approximately 12 feet from the screen, the back row, 24 feet.

Instructions for the test were essentially the same as in the Indi-

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vidual procedure: the inkblots were explained, and the subjects told to write down what they saw. Each slide was shown for three minutes during which time the subjects wrote down their answers at their own pace. Enough light came from the slides themselves in our particular set-up to allow for the writing of the answers. Just how much light may be allowed in the room is one of the details the study of which we have not yet completed.

Special booklets were prepared for the subjects to write in, all answers pertaining to one slide being written on one page and the pages turned as the slides changed. The flaps on either side of the page, which were not turned up during the recording of the answers, concealed on the left side a small diagram of the card in question, and on the other, aids for a modified inquiry.

When the spontaneous recording of responses was finished, the examiner made a short informal break, told the subjects to turn the flaps of the booklets on each side of their answers, and explained the reason for the diagram and for the words, *movement*, *color*, *texture*, and *shape* which were found inside the right hand flap. The subjects were then instructed to number their answers, to mark off the areas on the small diagrams corresponding to the answer in question, and to put the number of that answer under the headings on the right hand side if, and only if, he felt that by so doing he was describing his experience more accurately to the examiner. Slide 1, with areas marked off and numbered, was thrown on the screen during the first part of this explanation. Slide 8 served as an illustration of how various answers might be amplified by reference to color, movement, etc. When this had been explained, each slide was projected for a second time in the usual order for 2-3 minutes, and the subjects worked on their answers, this time with the room lights on but with the opportunity to refer back to the slides which were plainly visible. Additional answers were allowed during the period provided they were marked as such.

Our subjects consisted of 110 students with an average age of 20 years, the majority drawn from the men's and women's residences at McGill University and from the nurses training school at the Royal Victoria Hospital which is also part of the University. In addition we included 10 subjects in one of the control groups from New Jersey College for Women whose individual records were taken by Miss Alice Brown. These 110 subjects were selected both be-

cause of the important age group which they represented in view of the possible future use of the test, and also because information concerning their achievement, stability, leadership qualities, and adaptability was available from the college and hospital authorities. Since the most careful and detailed information was available concerning the student nurses, we selected them as our critical group. Table 1 shows the distribution of subjects.

TABLE 1

	<i>First</i>	<i>Repeat</i>
<i>A.</i> (1) 20 student nurses	G.	Ind.
<i>A.</i> (2) 20 student nurses	G.	Ind.
<i>B.</i> 20 college students	Ind.	G.
<i>C.</i> 20 college students	G.	G.
<i>D.</i> 30 college students	Ind.	Ind.
<i>E.</i> 15 persons (Interval from 6 mos. to two years)	Ind.	G.
<i>F.</i> 4 "tumor suspects"	G.	—

Our procedure in regard to the repeat performances in *A*, *B*, *C*, and *D* was as follows: In *A* the Group tests were given on a Saturday morning to 20 persons. Then at some time between the following Monday and the next Friday all these subjects were given the test individually. Subjects in *B* took their Individual tests from two to six days before they all met for the Group test. In the same way repeat Group tests (*C*) were held on the second, fourth, and sixth day after the first performance. Subjects in *D* took their two Individual tests with two, four, or six day intervals between them. Thus in each group, *A*, *B*, *C*, and *D*, a similar distribution of intervals between repeat tests was maintained.

It is perhaps well at this point to add some further details about the inquiry previously mentioned. How reliable was the information which we obtained from it? Our first method of checking was as follows: In addition to conducting the usual inquiry concerning the responses in the Individual records of our 40 subjects in Group *A*, we also gave an individual inquiry for the answers which they had given during the Group test, and compared the scoring derived from this with the scoring we had arrived at on the basis of the written

records with the "modified inquiry." When a discrepancy arose, both scorings were recorded so that we were able to see just in which cases and under what circumstances the two differed. Without going into greater detail it can be stated that only a very few responses appeared in a new light when this check-up was given, perhaps 10 of the 550 responses for the group as a whole.

A second check was conducted in Group C. Here, as will be remembered, two Group tests were given. Our method in this case was to omit in the first Group test that part of the inquiry which involved the recording of movement, color, texture, and shape (retaining, of course, the marking off of areas on the diagrams), but to ask for it in the repeat performance. Comparing our scoring of the records with and without this part of the inquiry led us to the conclusion that while it was perfectly possible to score records on the basis of the spontaneous written responses and delineated areas alone, it, nonetheless, helped and made for greater accuracy if the subjects were encouraged to give additional information.

The study of the records of these subjects taken under the conditions described allowed the following general questions to be raised in regard to the new procedure:

1. How closely will our estimate of these 40 student nurses, derived from their Group performance records (and taken one week after their entry) correspond to their achievements, scholastic and practical, at the end of an intensive three month training period?

2. What differences, if any, are found between a performance under the Group and Individual conditions? What differences are due to the inevitable introduction of the factor of repetition?

3. It has become our practice at the Montreal Neurological Institute to utilize the restricted and typical picture presented by persons with brain lesions as a diagnostic aid in cases of brain tumor suspects. Can the new method pick up such information? Can we discover the individual with a brain tumor from his reactions to the slides as well as to the cards?

4. Among the 15 persons who repeated the test after a considerable interval of time were some whose life and circumstances had changed drastically. Will the Group procedure be able to register these known and overt changes in behavior as reliably as we have come

to believe the Individual method can? Will such changes be significantly different from those introduced by arbitrary factors?

Let me try to epitomize a great many results in a very short time. First is the fact that the written material is *identical-in-kind* with what all Rorschach workers are accustomed to record from the spoken responses. To substantiate this I must refer you to the following record:

Typical record under Group conditions. Student nurse, aged 20, rated as good average student. It will be seen that *M* and *C* answers are well represented and that some of these answers are frequently found in records taken in the usual way.

I. Face of glossy black cat, like a hallowe'en decoration (*W*).

II. Two people talking over a small table, possibly twins, with clothing, hats, and hair styles the same. Arms are folded on the table. Salt and pepper between them (*W*).

III. Two figures, women, according to their shoes, maids possibly. They are lifting some heavy object (*W*). In the middle there is a red butterfly upside down (*D*).

IV. Face of some insect, highly magnified, furry (*D*).

V. Bat, with wings outstretched (*W*).

VI. Old fashioned warming pan for bed. The handle at the top has a fringe of fur attached (*W*). Also has a fur rug, and the handle of a mace (*W*).

VII. Two women, about the middle of the 19th Century. Both pointing in different directions (*W*).

VIII. Crest of some institution or family, two animals flanking a crown. The crown is standing on an orange and red base (*W*).

IX. Red and green figures, Chinese dragons or devils, standing on lower red base, possibly smoke or flame (*W*).

X. The cross section of a red tulip, upside down (*D*). There are blue flowers on each side (*D*). There are also yellow and orange buds of some other plant (*D*).

Contrast this with these excerpts from another type of record which you will also recognize, the over-anxious individual with the high small *k* column in the psychogram.

Excerpts from record of student nurse, aged 29, considered by the authorities as having failed to adjust during training period, and discontinuing at their suggestion.

IV. X-ray of part of throat, looking into mouth (*Dr*). X-ray of part of spinal cord or back bone (*Dr*).

VI. X-ray of part of throat which includes palate (*W*).
Frozen ice (*Dr*).

VII. X-ray of pelvic cavity (*W*). Wreckage following
German bomb. (British would have destroyed all) (*W*).
Person stuck between rocks (*dd+D*).

VIII. X-ray of throat showing tonsils (*Dr*).

IX. X-ray of part of vertebra (*Dr*). X-ray of sternum (*Dr*).
Twin babies grasping for support (*D*).

Or consider the variations of the well-known "bat" and "butterfly" answers which differ from individually recorded records, in my experience, only in that a larger number of persons gave a full spontaneous description rather than the monosyllabic "bat."

A bat which has been shot or cut in four places and is gasping for breath, and at the same time using its claws to harm whatever or whoever injured it.

A bat with fur on its wings. Looks as though it had been awakened and was about to stretch its wings.

A bat-like insect or moth, with under-wings tucked under the top ones.

A bat flying through the air.

A skinned bat, with fur side down. Black.

A beautiful moth which had had its wings clipped through some accident, and is trying to move.

A large bat, drawn on paper. The ink has smudged at the tip of both wings. The bat is drawn as in flight.

A bat, poised for flight.

A bat, wings, horns, eyes crossed. Gives the feeling of mysterious terror.

A black bat.

Next look at answers with what might be called a particular "atmosphere" to them. Again I might bring to your attention the extent to which detailed information appears in the spontaneous responses.

Answers illustrating full descriptions and certain qualitative aspects of rich, rather bizarre, records. Both these students, (*J.A.*, aged 18, *fe.* and *Gi.*, aged 18, *ma.*) were considered as "eccentric, peculiar, Bohemian" by their respective college authorities.

V. (*Gi.*) "Three figures, two tough, worn, bearded thieves cowering to satan for comfort. Their clothing is in tatters, probably old furs, their elbows out. Satan's legs are cut off

at the ankles, and are skinny. His ribs show through his cloak; he is bent toward the man whose head is most bowed."

IX. Ballet scene: "Two big nosed Dickens' characters (as Uriah Heap) disgusted with each other, their spirits behind them wearing Merlin-like clothes and hats. Bored women in front blow their noses on dainty hankies. The mob in the cheap seats in front is gawking at it all. The women wear puffed sleeves, frilly dresses."

II. (JA)—"Weird dance being performed around a fire. Flames shooting up. Much stamping by two monstrous individuals. Space in the middle resembles a bat fish. Gives feeling of queer forms gathered around a fire at dead of night. Grave yard spirits and Dance Macabre. The rows of darker lines suggest rhythm."

IX. (JA)—"Witches brewing over their cauldrons. Spirits floating upward, eyes of a mask in the centre. Profile of Hitler in green. Suggests unseen powers brewing something. Circular motion at the bottom meaning smoke. Claws on hands of witches."

How will shading shock and color shock manifest themselves under the new conditions? At first sight it might seem that these important indices might be lost in the new procedure. The following examples, however, will serve to show that, far from being obscured by the new method, they stand out as clearly as before.

1. *Failure on colored and shaded cards*

Example: Nothing written on page, or "This does not remind me of anything."

2. *Delay before answering*

Example: "After the longest time I decided this might be a rug" (response to Slide VI).

3. *Color comment preceding response*

Example: "Red, black and white" (on Slide II). "Blue, pink and orange" (on Slide VIII).

4. *Comment and no response*

Example: 1. "There are two similar shaped blots on each side with one red blot joining them below. And a red blot above each side at the top. At the top the black blotches go forward to a point" (Slide II).

2. "Central gray line and gray splash" (Slide VI).

5. *Unjustified anatomical and geographical answers*

Example: "Organs" (response to VIII, IX, and X). "Map of England" (response to VIII).

6. *Senseless repetition*

Example: "The spinal cavity of a fish, the spinal cavity of a cricket, the spinal cavity of a crawfish, the spinal cavity of a lobster" (response to VIII).

7. *False starts*

Example: Sentences begun and then crossed out in Slide II, occurring nowhere else in the record.

It follows easily from this first result that all kinds of records, all degrees of productivity, differences in mental approach, variations in psychograms, will result from scoring these Group records.

The psychogram in Figure 1 tries to "kill two birds with one

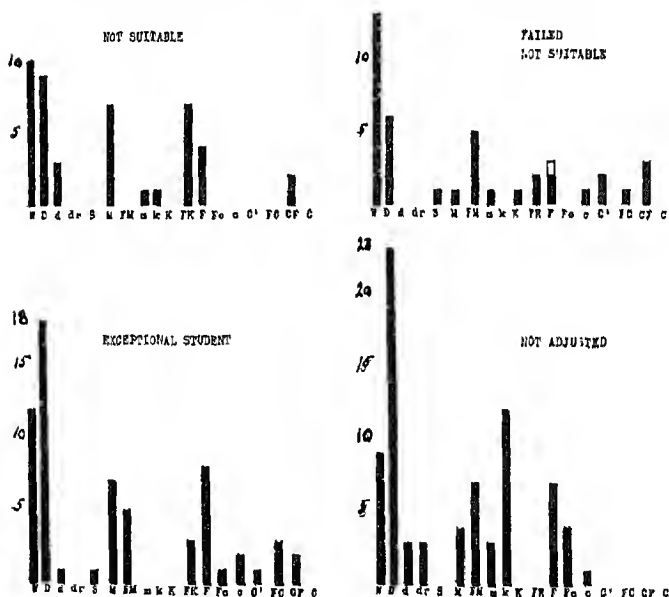


FIGURE 1

stone" by showing four very different records and at the same time illustrating how our results were corroborated by the opinion of the teaching staff. Here is a girl designated as an exceptionally good student, an excellent risk for further training, and here are others who for some reason or other were failing to adjust, failing in their courses, and thereby considered as unsuited to continue their training.

These three unsuitable students are shown to be what might be called various types of Rorschach problem children, the very high small k individual, the no FM and high FK individual, and the high FM , high CF , and low and minus F individual.

Perhaps the most interesting of our findings, however, resulted from a detailed comparison of the Group and Individual performance of the same subject. For while no consistent differences could be discovered between the performances under *different conditions*, certain consistent differences did emerge between first records and second records. Comparison of the two records of each person in our critical group, the nurses, showed four distinct trends or changes to occur in the Individual record which followed the Group performance within five days. These were: (a) An increase in the number of answers shown in 62 per cent of the cases. (b) A shift in mental approach always in the direction of greater specificity or a shift away from the larger perceptual units to the smaller in 32 per cent of the cases. (c) A change in F per cent in 25 per cent of the cases. (d) A reversal in $M:C$ ratio in 27 per cent of the cases.

This finding would have raised a serious question as to the reliability of our new method had not the reverse conditions, where the Group test came second, revealed exactly the same trends. Moreover, repetitions which took place without any change of conditions (repetitions of the Individual method and repetitions of the Group method) showed exactly the same changes occurring to the same extent in the second record (Table 2).

Repetition, therefore, is a far more serious factor in changing the results than is the new method of presenting the slides and writing the responses.

However, the study of those individuals who took the Group test, when as much as two years had elapsed since their first record, revealed an important point in this connection. Among our group of 15 persons were several whose life pattern and circumstances were known to have changed drastically since the first test. Changes reflecting this very profound re-adjustment *were* demonstrable when the second record was taken under Group conditions, and these changes were out of all proportion to, and different in kind to, the changes which resulted from repetition per se.

This can be amplified to advantage with reference to Figures 2-4.

TABLE 2
PERCENTAGE OF CASES SHOWING CHANGES ON REPEAT PERFORMANCE

	Increase in responses	Shift of approach. "To greater specificity" (leeway 10%)	Change in F% (leeway 10%)	Change in M:C ratio (leeway .5)
A. 40 subjects				
Group . . . Ind.	62.5	32.5	25	27.5
B. 20 subjects				
Ind. . . . Group	65	45	40	35
C. 20 subjects				
Group . . . Group	85	45	25	30
D. 30 subjects				
Ind. . . . Ind.	66	43	36	30
Number of subjects	110	60 comparisons between performances under different conditions		
Number of records	220	50 comparisons between performances under similar conditions		

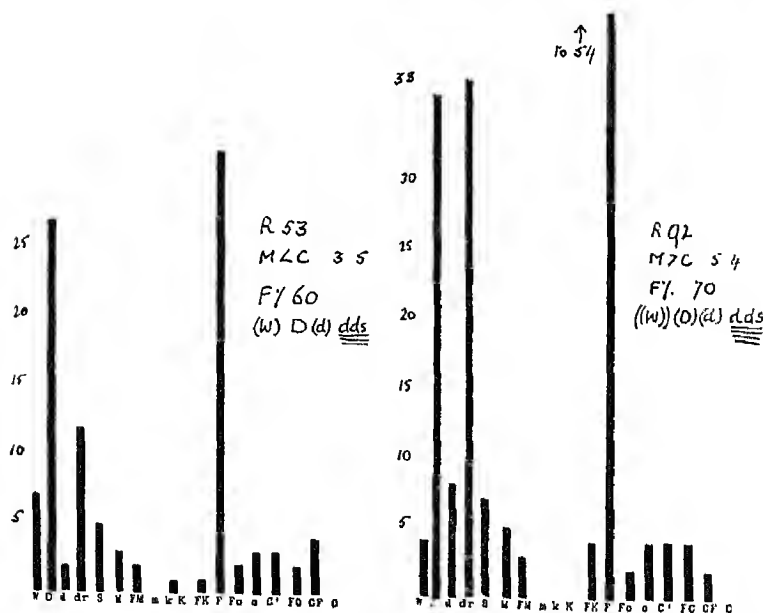


FIGURE 2

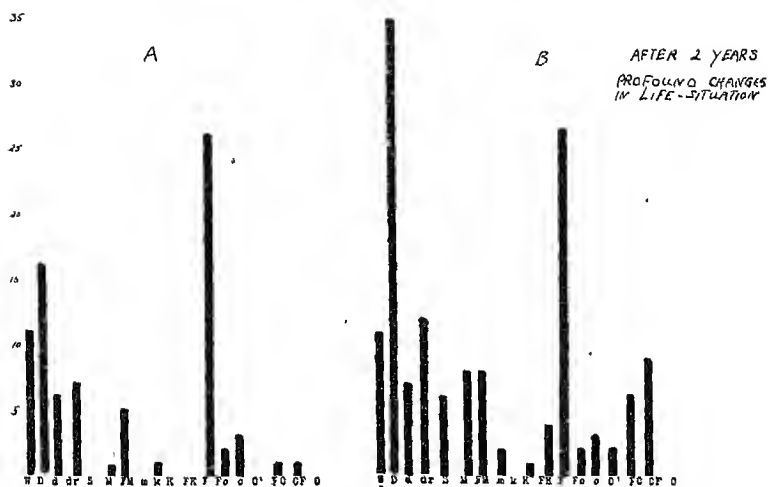


FIGURE 3

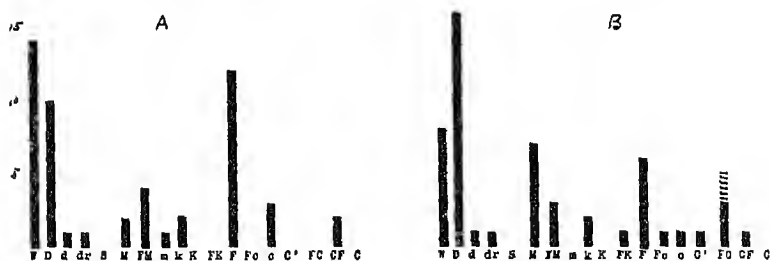


FIGURE 4

Figure 2 shows the psychograms of a college student (male, aged 22) derived from two Group Rorschach records within three days of each other. These particular records were chosen because this subject was the only one of our 110 who showed all the four changes mentioned in Table 2 as occurring on repetition. It will be seen that the responses are nearly doubled, jumping to 92 from 53. Moreover, only 28 responses were common to both records; in other words, Record B contained 200 per cent new answers. Then, the $M:C$ ratio is reversed ($M:C$ 3:5, $M:C$ 5:4) and a shift of mental approach occurs in the direction of preoccupation with the smaller units,

the *dr* jumping from 12 to 37, or from 23 to 40 per cent. Finally the *F*% increases from 60 to 70 per cent, thereby counting as a change according to the standards which we set in this investigation.

The interesting thing, however, is that, despite all these changes, one would be forced, even on considering the psychograms and far more by considering the records themselves, to come to very similar conclusions concerning the personality structure of this individual. What characterizes Record *A* is the constriction shown by the *F*% and the attention given to the small edge and inner details. It is exactly these features which are even more pronounced in Record *B*. All that we could say of him from his first record can be said again in the second—and more so!

In contrast to this the following two pairs of psychograms show changes which are of quite a different kind. Figure 3, *A* and *B* can be seen immediately to represent a change from an extremely constricted individual to one with an infinitely wider range of psychic reactivity. To point to just a few items—the *M* rises from 1 to 8; the *F*% drops from 65 to 37 per cent; the color responses jump from 1.5 to 12. This dramatic change, as exemplified in the Rorschach, is the counterpart of an equally dramatic change in the life situation of the individual. When Record *A* was taken the whole outlook of this individual was colored by a despondency and a profound discontent. Both in professional and personal life there were difficulties. He had, in fact, reached a point where it was impossible for him to continue as he had been living. The two years which intervened between the two Rorschach records amply rewarded the change of occupation and environment which he made just subsequent to the taking of the first record. Wide recognition followed his achievements in his new work. Similar changes accompanied this re-orientation as far as his personal life was concerned. It is small wonder, therefore, that the richness and freedom which his life had gained were reflected in the second Rorschach record.

Figure 4, *A* and *B*, also shows what must be called a significant change. Figure 4 *A* is the record of a psychoneurotic patient prior to psychotherapy. When the second record was taken eight months later, this individual was holding a responsible job, had ceased to be preoccupied with imaginary ailments, and was an adjusted member of society.

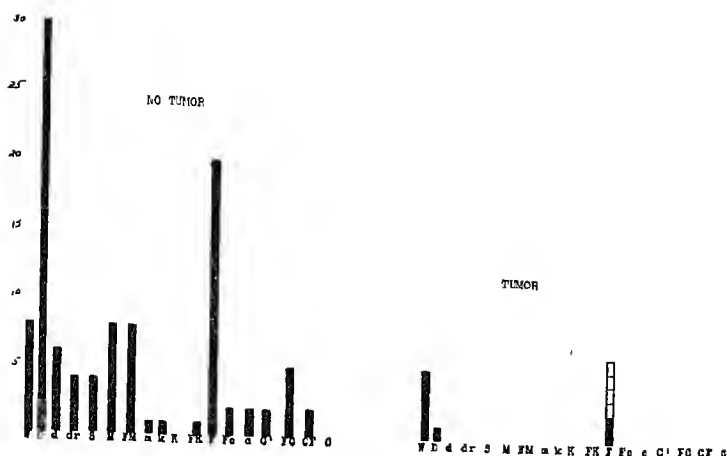


FIGURE 5

Figure 5 illustrates the fact that our diagnostic procedure in the case of tumor suspects can also be reflected by the new method. Four "tumor suspect cases" resulted in three records of the tumor type with a fourth which was normal. Diagnosis, made on the basis of the patients' responses to the slides, was correct in all four cases. Three persons had a cerebral lesion; the fourth was a mistaken clinical diagnosis.

Before drawing our final conclusions as to the usability of this modified method, it is well to point to some of the interesting problems which have been brought to light by the new procedure, or, perhaps more, by a bi-product of the new procedure, namely, the repeat Rorschachs of 110 subjects within a week.

First in importance as a problem to be investigated would seem to be the fact that nowhere do we find a second record showing an emphasis on the larger perceptual areas. The shift is always in the direction of greater specificity. And why within five days should an individual change from $W ((D)) (d)$ to $(W) D \underline{ddS}$? As has been pointed out such changes occurred in all four constellations of conditions without any difference.

Secondly, while a very large proportion of the changes in $M:C$ ratio belong in the category of insignificant changes (as for example the ratio, $M:C$ 8:8 becoming 7:8.5), there are, nonetheless, those

persons who show changes of 1:6 to 2:2.5 or 3:4 to 6:1.5. It can hardly be said that the same picture is presented by these two last mentioned individuals in the two performances, even though only three days elapsed in each case between the repeats. What factors are responsible for this small number of cases to whom we must consider as having changed in *erlebnestypus* in the interval?

A third fact of interest is the subjective experience of the individual when taking the test under the old and new conditions. The fact that 59 per cent enjoyed the Group test more and 41 per cent the Individual is relatively unimportant, but the reasons given for this preference are interesting. In Table 3 are given some of the reasons supporting an individual's preference.

TABLE 3

<i>Preferred Group test because:</i>	<i>Preferred Individual test because:</i>
1. It was more enjoyable, interesting, or thrilling (7 persons).	1. It was more interesting (1 person).
2. The answers were more spontaneous. It was easier to express foolish things. One felt more at ease. It was easier to concentrate (8 persons).	2. One felt more relaxed, confident (4 persons).
3. It was more fun with everyone working together (4 persons).	3. One was not disturbed by others (1 person).
4. One was able to pick things out more easily and see more (2 persons).	4. One could see more details (1 person).
5. It was easier to write than to speak (3 persons).	5. It was easier to speak than to write (2 persons).

It will be seen that many of the reasons are the same, even though attached to one or other procedure. In essence some individuals feel freer when writing in the dark; some feel freer when in contact with the examiner, and so on.

The question of whether the experience of looking at cards or slides was the "same" elicited an unequivocal "yes" from 83 per cent of the persons questioned. The remaining 17 per cent, however, felt that the experiences were different. On the one hand there was the feeling that the slides were more life-like. On the other hand was the objection that the cards could be turned while the slides could not.

This reason, ironically enough, was given by a subject who gave 10 responses in the Individual test when she could have turned the cards, and 59 responses in the Group test when she could not!

Another interesting feature was the conviction of 12 per cent of the individuals that they had "done better" in one or other of the tests. Comparison of the records revealed virtually identical performances in all but one of this number.

CONCLUSIONS

While there remains a vast amount of material to be studied and facts to be learned from these records, it would seem that we are in a position at this stage to utilize the Group method in situations where it will have definite advantages over the Individual method. For while it is no short cut to Rorschach training, and no substitute for Rorschach experience, it does eliminate the more mechanical aspects of the test, leaving the examiner with more time, interest, and energy to put into the study of the records per se. If the Rorschach Group method is to be used where staggering numbers of persons are to be tested, only by some such adaptation can it meet the demands which will be made of it.

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A PICTORIAL METHOD FOR STUDY OF SELF IDENTIFICATION IN PRESCHOOL CHILDREN*

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This is the report of an attempt to develop a method for making controlled studies of the growth of children's ideas about themselves. Because of contemporary emphasis on the importance of the early childhood years, it seemed advantageous to be able to tap these ideas as early as possible, to get a clear record of them before the beginnings had become distorted, repressed, and overlaid with later learnings. This meant devising techniques that could be used before active verbalization had been established. Even after the child has begun to verbalize he frequently cannot express feelings, desires, and beliefs because they require too subtle or too complicated verbal definition for him to handle. There is also the possibility that many aspects of the child's ideas concerning his relationship to his surroundings and himself which are later lost to conscious manipulation because of the protective dynamisms of the ego may be conscious and directly recordable at an earlier stage of development, perhaps before recognition of their inappropriate or reprehensible qualities. All these considerations prompted the investigator to cast about for techniques that could be applied before the child could talk, and that would yet give clear and intelligible results.

Although the investigator is well aware of the importance of free play techniques in giving clues to the inner life of the child, several difficulties in their use indicated the desirability of other methods. The use of free play techniques seemed inappropriate for the investigation of certain specific problems for one thing because the investigator has to chance getting nothing relevant to his special

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interests from those individuals for whom that sphere was not of pressing personal importance. Even the presentation of material designed to bring forth behavior relevant to specific areas can not overcome this difficulty, since children can be expected to respond in free situations in terms of internal pressures and to perceive and manipulate and contravert whatever materials are at hand in the service of these pressures. For example, this investigator found pre-school children turning the most unequivocal miniature household items into objects having special meanings to them, meanings not possessed for the casual observer by the toy itself. A bathtub was called a truck, a soapdish was a rowboat, other pieces of furniture were used simply as building blocks. While this tendency to bend to their special needs any materials at hand makes fruitful the use of projective techniques and is of value in a general and therapeutic study of child personality, in the face of it the investigator with a concretely defined and specific interest frequently finds difficulty in eliciting behavior pertinent to this interest. The problem of meaning also arises, and involves the personal equation of both situation and activity: what the situation means to the child and what his behavior is meant to express. These difficulties are, of course, functions of specific research situations only and are by no means to be considered ubiquitous with reference to the use of "free" projective methods.

In this explanatory study, no attempt was made to get below the passive language level of development, but the very fact of the existence of passive language before active verbalization develops seemed to indicate possibilities of study at a very early age. There is nothing new in the technique finally devised except its application to very young children and the attempt to use it in the investigation of problems of subtlety and complexity in such a population. Pictorial techniques much like those discussed here have been used earlier by Deutsch (4) and others in work with young adults. Similar techniques have been used in the study of racial attitudes in children (6, 7). An earlier report (8) of racial aspects of the present study led to a more extensive application of these techniques (1, 2, 3). Less controlled use of pictures in explorations of personality in children have been reported by Murphy (10, 11) and others (5, 9). Briefly, the essence of the techniques consists in simple pictorial

presentation of several possibilities, accompanied where possible by a standard verbal description, and a choice by the subjects. An abstract description is necessarily vague. By "possibilities" we mean presenting several essentially similar situations, differing, however, in the critical quality. For example, if one wished to find out whether a child considered a parent pleasant or unpleasant, petting or scolding, indulgent or severe, one could present appropriate paired pictures, with the question: "*Which one is your daddy?*" Or one could present one paper doll body and several heads (representing the choices given) and suggest that the right "daddy-face" be put on the body. The specific ways in which this principle of choice among concretely presented items can be worked out are limited only by the ingenuity of the investigator. The important thing to note is that the investigator must have in mind specific items for investigation, that the materials be simple and as nearly unequivocal as possible, and that the choices given be really parallel and mutually exclusive, so that if the subject makes one choice he is excluding the other possibilities presented. Subtleties of weighting can be worked out by a paired comparisons method of presentation. It may be noted that this method calls only on the child's ability to recognize visually presented objects and on his fund of passive language, and requires a very simple bit of behavior of him to indicate his choice.

Since ideas about the self seem to play a decisive rôle in the relative effectiveness of the fully formed personality, the writer chose to use this technique in studying some aspects of self-identification in young children. An attempt was made to choose aspects which have been emphasized as important for the development of the personality. Psychoanalytic discussions, for example, stress the importance of family relationships and children's wishful identification with the parents. In Individual Psychology, relative size and sex have been stressed as foci of adjustment problems. Other discussants in the field of personality development insist on the destructive effects of minority group membership, racial and economic. This insistence, coupled with the psychiatric emphasis on the proportionately greater psychic importance of events occurring in early childhood over those coming after the first "formation" of the personality, led to the inclusion of racial identification and awareness of economic status as areas to be investigated. Lastly, eating habits were included because

much stress on self-reliance in eating was common in the nursery school in which the study was done and we wished to see if special stress of this kind led to flagrant wishful assertion and a tendency to deny reality. All the items included could easily be verified so that consistently wishful reports could be identified by reference to all responses given by the same child.

Twelve sets of pictures in all were used, three for the racial identification, three for identification with reference to familial position, and one each for age, size, sex and eating habits. The materials and results dealing with racial aspects of self-identification have been described elsewhere. Here we shall deal with the materials relating to the other items.

AGE

A page bearing pictures of four children was presented to the subject and he was asked, "*Which one is you? Which one is———?*" (using the name of the subject). Each child on the page represented a different age, perhaps best described by referral to a range rather than a point: infancy, nursery school, pre-adolescent or elementary school age, and adolescence. Two sets of these pictures were prepared, one with four girls, one with four boys. The sex of the picture shown coincided with the sex of the subject.

Out of eight girls tested, six identified themselves with the correct-age child on the pictures, one (2-3)² was doubtful, and finally chose the baby and one (5-0) identified with the baby without hesitation. Six out of 14 boys chose correctly. One (2-5) refused the task, one (3-0) hesitated and finally chose the baby, three without hesitation chose the elementary age child, and two chose the adolescent. It may be of interest to note that no girls identified with any of the older children, while five of the boys did. No boy, on the other hand, who was himself unequivocally past the "baby" stage, identified with the baby picture, while one girl, the oldest in the nursery school group, did. In addition, it might be noted that more girls were uncertain of their choices, making one or more hesitation gestures before the final decision. Three girls did this, one first identifying the baby as herself, then switching to the elementary school age child,

²The first digit refers to the years, the second to the months of the child's chronological age.

then changed to the correct picture. Only one who was at first undecided made an incorrect choice finally.

It might be thought that actual position in the family would determine a choice as relative as these, but that did not seem to be so. Certainly it did not explain the incorrect choices—having a younger brother did not determine the child's identification with an older individual. While one boy who incorrectly identified an older child's picture as himself, spontaneously pointed to the nursery school age child and said that that was his brother, another, a girl who had a sister of an equivalent age difference, identified the sister as the baby and herself as the nursery school age child. Another girl and another boy correctly identified younger siblings with the baby and themselves with the nursery school age child. This tendency to offer spontaneous identifications of siblings seemed to indicate that the task was approached seriously and realistically by the children. Only one child thought it was a kind of game and turned the tables on the investigator by pointing to a picture of a red hen on the wall and saying, in exact imitation of the investigator's intonation, "You?"

SIZE

One picture was used for both boys and girls. It showed two children walking together, both dressed similarly in short trouser-like garments, with similar haircuts, rather indeterminate as to sex, one child taller than the other. The smaller child appeared to be of nursery school age. This picture was presented to the subjects with these remarks: "*Here is a picture of two children. Which one of these two is you?*" The subjects indicated their choices by pointing.

This was presented to 7 of the girls and to 10 of the boys. (The selection was arbitrary, dependent on presence in the nursery school on the day that the test was given.)

Five of the 7 girls identified themselves with the smaller child; one refused the task, and one said she was the larger child. The latter said the smaller figure was her brother. She had previously shown a tendency to identify herself with the elementary school age figure in the "age" test, although her final choice was the nursery school age child. This subject was 3-11 at the time of the testing, in the middle age group of her nursery school population.

Six of the 10 boys identified themselves with the smaller figure;

three each said the larger child was he, and one refused the task. Two of the boys who said they were the larger child had also identified themselves incorrectly on the "age" series with the adolescents. There seemed to be a persistent tendency among some of the boys to identify themselves as larger and older than they were. In addition, in spontaneous remarks they stressed "bigness." (One of the techniques in this school for getting the children to cooperate was to say, "*Now you're a big boy [or girl]*" in approving tones when the child tried to be self-reliant and follow the routine. Several of the children spontaneously approached the examiner in free time on the playground to call her attention to how "big" they were, showing off in stunts on the play equipment meanwhile. "*Big boys [girls] don't cry!*" was an effective way of stopping tears at the departure of parents.)

SEX

The picture for sex identification showed a boy and a girl walking together. They were of about the same size and age. The child was asked, "*Which one is you?*"

All the eight girls identified themselves correctly. Twelve of the boys made correct choices. The two boys who were incorrect were 4-8 and 5-1 respectively, and the investigator confesses to having no cue to explain the errors.

FAMILIAL POSITION OR STATUS

Three different sets of pictures were used for this item. One of the pictures was of a parent and a child of the same sex (mother and daughter, father and son); one was of a parent and a child of opposite sexes (father and daughter, mother and son); and one showed a family group consisting of mother, father, son, and daughter. (These will be referred to below by the numbers given them in the series: 3a, 3b, 6a, 6b, and 8, respectively.) Both pictures showing the mixed sexes were shown to each child.

On Pictures 3a and 3b the choice to be made was simply child or parent, both figures in the picture being of appropriate sex. On that picture, five out of eight girls identified the daughter correctly as themselves, while three said they were the mother. Eight out of 14 boys identified themselves as the son, three said they were the father

and three refused to make a choice. No single guiding principle seemed involved in the "errors." The girls who identified themselves with the mother ranged in age from 2-3 to 5-0 (youngest to oldest in group). The youngest had previously identified herself as the infant rather than as the nursery school age child on the "age" pictures but as her real age placed her in a rather ambiguous group this could not be called an error unequivocally. She identified herself with respect to race, size, and sex correctly. In the picture showing a father and daughter, she said she was the daughter, but when she was asked to choose between a mother and son, she chose the mother. This latter choice is in line with what most of the others did on this item, but on the whole family picture she identified the son as herself, although she had the chance to choose the daughter in the picture. In the "eating" picture she was the only girl who said her mother fed her, yet the nursery school teacher reported that she was one of the most self-reliant in the group. She had no father at home and her mother was almost blind, a situation which almost forced self-reliance.

Another girl who said she was the mother in the picture was at first undecided, identifying with the daughter and then changing her mind. She made no other error in the whole series. The third girl made only one error in the series, when she identified herself with the infant in the "age" pictures.

The boys who made errors on this picture differed from each other as much as the girls did. They ranged in age from 3-7 to 5-0. One (3-7) designated himself as of nursery school age, and the smaller child in the other pictures, but identified with adults in the family pictures in three out of four chances to do so. Another (3-8) was a child who consistently emphasized his "bigness" and made all possible identifications on that basis. He identified with adults four times out of four chances in the family pictures. The third boy who chose the father figure as himself, showed no such consistent tendency as the other two did. He did identify with the boy of elementary school age on the "age" pictures, but he also identified correctly with the smaller of the two children on the "size" picture and on the other three family pictures identified consistently with children rather than with adults.

The second set of family pictures shown the children presented

them with something of a poser. Since on each picture the parent and child were of different sexes, one of the two pictures presented each subject with the need to make an incorrect identification, identifying either with a child of inappropriate sex or with an individual of the same sex as the subject, but of different age and familial position. The object in presenting these pictures was to discover which of the two was the more important determinant at this stage of development.

Faced with this mixed choice situation, four out of eight girls refused the task as did six out of the 14 boys—the largest number of refusals on any one item. Of those answering, three of the girls identified with the mother and one with the son, while three of the boys identified with the father and five with the daughter. It would seem that in this group sex was the more important determinant in the girls' group, while child-adult status was more important for the boys. This is rather surprising in view of the greater relative emphasis the boys put upon bigness and being big, but this is in line with the results on the "sex" pictures, where two boys made errors and no girls did. The one girl who identified with the son in the picture was 3-1 and made no errors on the other identifications. Two of the others identifying with the mother in this picture identified similarly with adults on at least one or more other family pictures, even when the choice was not a forced one, that is, when an individual appropriate in both sex and age was included in the picture. Of the three boys identifying with the father, two identified with adults in at least three out of the four family pictures. The other was undecided and after indicating a choice started to change, then refused the task.

When the father-daughter picture was presented to the girls, seven out of eight identified themselves as the daughter. The one girl who chose the father had identified herself also with the mother in two other pictures. This picture was used to test the limits of cross-sex-preference and adult status preference. If a girl identified with the son, in the mother-son picture, for example, to what extent would the cross-sex identification persist? Would it show itself even when it meant an incorrect status choice? Would other adult status choices be repeated even here, where it would necessitate a cross-sex choice as well?

Of the boys, when confronted with the mother-son picture, eight (out of 14) identified themselves correctly as the sons, four refused the task, and two identified themselves with the mother. The same two had previously identified themselves with the father in the father-daughter picture. No child maintained a persistent cross-sex identification, but several showed fairly strong need to assert themselves as in the place of parents.

The last family picture used showed a complete family, consisting of mother, father, boy, and girl. Seven of the eight girls said they were the girl in the picture. One said she was the boy. No girl identified with either of the parents. Twelve of the 14 boys said they were the boy. One identified with a doll included in the picture, calling it a "baby." He was 3-1, and a younger sibling. One boy identified with the mother—the most persistent of the "parent identifiers." This child had made incorrect identifications consistently except in the question dealing with sex. His emphasis was on "being big," an emphasis he verbalized, and one which colored most of his choices. In the "age" picture he pointed to the adolescent as being himself. In the "size" pictures he said he was the larger of the two children. In the other pictures of family groups he identified with the father and with the mother, never with either of the children. In the pictures contrasting "rich" and "poor," he said he was the "rich" boy in one and the "poor" boy in the other, explaining that the latter was "big." In the "eating" picture, he said he was the child who fed himself. In reality, he was 3-8, and amongst the most immature of the children, requiring aid in eating, in a group where most of the children took pride in eating without assistance.

ECONOMIC STATUS

These materials were presented to the boys only, equivalent materials suitable for girls not being available to the investigator at the time of the study. The materials consisted of two pairs of pictures. One showed a well-dressed boy on skates at the left side of the page and a boy in ragged clothing on the right side of the page. The other showed the ragged boy on the left side of the page and a well-dressed boy on the right. On the second page, the well-dressed boy was somewhat younger in appearance than the other. These pages were known as Pictures 5 and 7 respectively.

On Picture 5, four of the boys identified the ragged boy as themselves, seven chose the well-dressed boy, and three refused to make a choice. The four choosing the ragged boy were adjudged the most mature in the group by the teacher, though they were not the oldest. Since all these children came from families with sub-marginal incomes, this might be considered the "correct" choice. On Picture 7, five chose the ragged boy, seven chose the well-dressed lad, and two refused. One subject who had refused to choose on Picture 5 this time chose the ragged boy, saying that one was "bigger." One subject who had identified himself with the "poor" boy on the first picture changed to the "rich" one this time. One who identified himself with the "rich" boy before, changed to "poor" this time because the latter was "big"; another made a similar change without spontaneous explanation. Out of the 14 subjects, two refused consistently; one was very young (2-5); and the other was suspected of extreme backwardness in mental development. Five consistently identified with the "rich" boy and two with the "poor" boy. This was the only set of pictures on which the majority of the subjects made "incorrect" identifications. Obviously not all the identifications were made on the basis proposed by the investigator, other factors making more appeal to the children's interests.

EATING HABITS

The material for this area consisted of one picture showing a child feeding himself and one showing a child being fed by a parent. There was a set each for boys and girls. The investigator said to the subject, "*This little boy (girl) eats alone. This one is fed by his mummy (daddy). Which one is you?*" Seven of the eight girls said they ate alone. The one child who said she was fed was mentioned above. It may very well be that this was a symptom of a need not otherwise expressed in behavior, the need to be a bit more dependent than she had been allowed to be.

Ten of the 14 boys said they ate alone, three said they were fed, and one refused to make a choice. Two of the "independent" boys were in reality dependent upon help in eating. Both stressed "bigness" verbally and in other identifications. Both had been subjected to much propaganda about being "big." One of the boys identifying

himself as "dependent" in eating was perhaps the most mature in the group and a decided leader.

SUMMARY

Table 1 summarizes responses on the different items. It includes

TABLE 1
INDICATING CORRECT, INCORRECT, AND NO RESPONSES MADE BY NURSERY SCHOOL CHILDREN TO MATERIALS DEALING WITH AGE, SEX, SIZE, AND FAMILY STATUS

	Age	Size	Sex	Familial status		
				Same sex	Mixed sex	Whole family
Correct	13	11	19	13	16	19
Incorrect	8	4	2	6	3	3
No choice	1	7	1	3	3	0

only those items the responses to which could be appropriately classified as "correct" or "incorrect."

CONCLUSIONS AND DISCUSSION

"Conclusion" seems altogether too pompous a term to apply to a brief summary of the result of the work with one small nursery school group. The investigator is well aware that this summary can be neither generalized nor predictive. In the group described here sex and familial position were the most generally correctly identified aspects of the self. Comparative age and size seemed to be more ambiguous areas, not so clearly marked off for these children as the other two items. The possible differences in data effected by form of materials is well illustrated by the three family pictures included in the table above. The picture that offered the most clearly structured situation, showing a complete family together, evoked the greatest number of correct identifications. The picture in which the parent and child of opposite sexes were shown ranked second in number of correct responses evoked. This picture "fences off" the choice as it were, since to make an incorrect identification the subject would have to cross sex lines as well as age lines. The picture evoking the fewest number of correct responses was the one setting up fewest barriers to error, where parent and child were of the same sex.

This difference in number of correct responses obtained with the

three different pictures of family units emphasizes a pertinent point. It may very well be that the results obtained with this series of pictures might not hold if different pictures were used. There is also the possibility that the pictures testing all areas were not equivalent in cues to the child. For example, the page for age identification contained four figures, while the one for size identification contained only two. Each of these probably presents a mixed age-and-size cue to the subjects, since the smaller child is also the younger. From the remarks made by the more verbal of the children the investigator suspects that they were responding to the size cues mainly. A great deal of work is necessary to make pictures comparable when different areas are investigated for comparison purposes. It is doubtful whether perfect equation is feasible, but it is certainly possible to devise several sets of materials aimed at the same area to check on consistency of trend. The technique, however, seems extremely promising in spite of this difficulty. When it is used for widespread surveys with reference to one area of identification, as the Clarks used it with reference to racial aspects of self-identification, the problem of materials is perhaps not as great, although even here it is necessary to sample populations to whom the same set of materials will present approximately the same meaning. It may also be necessary at present to control the intelligence of populations to be compared; the effect of intelligence on responses to this kind of material is a separate problem calling for study.

Where an attempt is made to relieve the child of the necessity of verbalizing, one must be extremely careful to guard against position habit. Perhaps the most outstanding service attributable to this preliminary try-out of materials was pointing up of the problem of cues not pertinent to the focus of the study, but important for the individual subjects, whose tendency to respond to these extraneous details obscures the results of the investigation. For example, it is difficult to decide what the results of the "rich-poor" aspect of the study means, because of the subjects' tendency to classify the poorly dressed boy as "bigger." To some extent this may be the fault of the materials. On the other hand, it is possible that in the economic stratum from which these children come it is the older children who are permitted to dress raggedly while the younger ones are fairly neat and clean. Thus, if the subject, being small-big minded, decides

that the well-dressed lad is younger, and therefore identifies with him, what looks like an incorrect, unrealistic response becomes correct, but not on the investigator's cue. A striking example of this sort of thing occurred when the material for racial identification was presented to the children. One girl, the oldest in her group, who had expressed advanced and well crystallized prejudice against Negroes, identified herself with the picture of a Negro girl, because the latter had curls and she, too, had curls which were her glory and pride. Although accurately perceiving the racial nature of all the other pictures, she denied that this one was of a Negro child. Neither the albedo of the picture nor the facial characteristics of the child were strikingly less "Negro" than others presented.

The cautions mentioned above, however, are no more than have to be observed in preparing and interpreting responses to almost any materials. In addition to its usefulness as a survey instrument, the technique is valuable in selecting individual children for intensive study, and, going even further, in highlighting special areas within individuals that call for close inspection. At a glance one can detect responses that set individuals apart from group trends, and areas within one individual inconsistent with his own major trends become equally visible. It would be fruitful then to follow such atypical individuals not only absolutely, but comparatively, to study not only what he is in himself, but how, in what direction, and for what reasons he differs from the others: this, too, with inconsistent responses within the record of one individual. To illustrate the first case mentioned, that of the atypical individual, we might refer to *E. L.* (3-1) who refused many of the tasks presented, which all others in his age group attempted, or to *L. J.* (3-8) who differed from most of the group in basing all his identifications on his desire to be "big." An example of the second instance, individuals who show special inconsistencies, is *D. K.* (3-7) who identified correctly with respect to age, size, and sex, but insisted on identification with adults in three out of four chances to do so in the pictures of family groups. Children showing marked confusion in areas clearly understood by most others in their age group might well profit from special attention. This technique could aid in their selection when they might otherwise go unnoticed. It could certainly help define confusions that otherwise to the observer seem vague and unfocused.

The work here reported performed such a service incidentally in the nursery school in which it was carried out.

To sum up, then, it should be emphasized again that this is essentially a note on methodology, the specific results herein reported being of only incidental interest. When an attempt was made to interpret the findings, certain limitations of the method became apparent. Outstanding among these is the necessity to supplement it with verbal and behavioral material when responses are unexpected or atypical. In spite of these limitations, however, the method seems of great promise. Although a follow-up study of the racial aspect of self-identification was made in response to publication of a small part of this enterprise, the technique has not been even fully investigated, and there remain numerous fields for its exploitation.

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A MODIFICATION OF THE SLIDING FRAME FOR REGISTERING CHOICE

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The following is a modification of the Sliding Frame described in this JOURNAL (1940, 57, 219-20) in which a rotating rod with movable or stationary stops replaces the hinged board of the original device. The drawing, Figure 1, shows a rod with peg-stops sus-

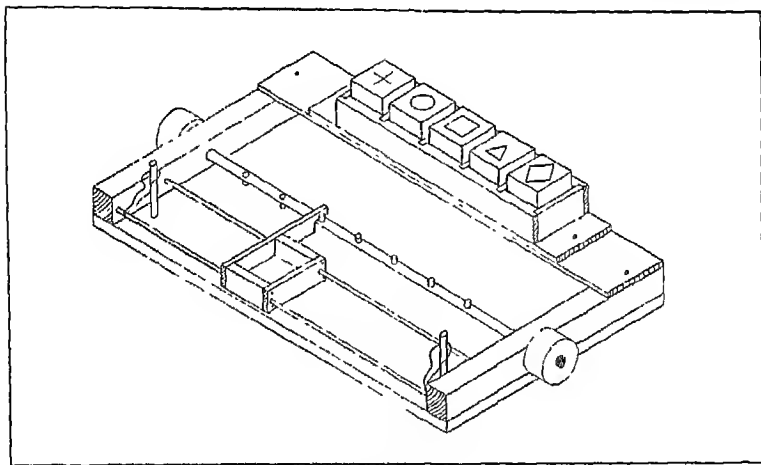


FIGURE 1*

**Directions for Operating*

1. Screw or clamp the platform of the device to a table, leaving both hands free.
2. Remove the line-space pegs, insert under the frame a sheet of specially punched paper, push the paper forward until the first pair of punches coincides with the holes in the platform and replace the pegs.
3. Push the extended side of the frame against the first stop and with a printing block print in the upper partially enclosed section an item to which response is to be made by the subject in the enclosed section of the frame.
4. Release the frame by pressing the stop down with the forefinger,

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Figure 1, or by giving the knob a quarter clockwise turn if the rod has stationary spirally set stops.

5. At the end of the line of items, remove line-space pegs and push the paper forward until the second pair of punches coincides with the holes in the platform and replace the pegs.

6. After the paper has been freshly adjusted, pull the frame to the left. This requires with stationary spirally set stops a few partial turns in reverse.

7. Raise the first stop at the left by a partial turn of the knob and repeat from "3" above.

pended in holes in a straight line, two of which have been pressed down by the forefinger of the operator to allow the frame to be pushed against the next stop.

Another type of rod, not shown here, has round-headed screws spirally arranged so that a clockwise quarter turn of the knob brings each succeeding stop into an upright position at the same time lowering the preceding stop so that the frame can be pushed to the right. The rod in the drawing, Figure 1, is designed primarily for the subject as operator, the rod with spirally set stops, for the experimenter.

The writer gratefully acknowledges the examination of the materials by her former instructor, Dr. Walter F. Dearborn, Director of the Psycho-Educational Clinic, Harvard University.

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BOOKS

The *Journal of Genetic Psychology*, the *Journal of General Psychology*, and the *Journal of Social Psychology*, will buy competent reviews at not less than \$2 per printed page and not more than \$3 per printed page, but not more than \$15.00 for a single review.

Conditions. Only those books that are listed below in this section are eligible for such reviews. In general, any book so listed contains one or more of the following traits: (a) Makes an important theoretical contribution; (b) consists largely of original experimental research; (c) has a creative or revolutionary influence in some special field or the entire field of psychology; (d) presents important techniques.

The books are listed approximately in order of receipt, and cover a period of not more than three years. A reviewer must possess the Ph.D. degree or its equal in training and experience.

Procedure. If among the books listed below there is one that seems important to you, you are invited to write a review of that book. It is not necessary to make arrangements with the Editor. Just send in your review. It does not matter if the book in question has been reviewed before.

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CRITICAL REVIEWS OF RECENT BOOKS

(*Hilgard, E. R., & Marquis, D. G. Conditioning and Learning. New York: Appleton-Century, 1940. Pp. 429.*)

REVIEWED BY H. B. REED

Hilgard and Marquis's book on *Conditioning and Learning* is a review and interpretation of the experimental literature on conditioning. Its completeness is indicated by the fact that a total of 973 references are used, the exact citations of which are given in a 64-page bibliography near the end of the book. Over 90 per cent of these are directly on some phase of conditioning, the others being general works which relate in part to the conditioning process. Conditioning is thought of as a process of training through which a response, usually a reflex, becomes attached to an experimental stimulus which occurs in proximity with the unconditioned or natural stimulus and is followed by some reward or punishment called a reinforcement. The classical example is the training of Pavlov's dog to give a response of a flow of saliva to the sound of a bell which was presented a number of times in conjunction with food. In this case the food is the natural stimulus, the bell is the experimental stimulus, the flow of saliva is the reflex which becomes conditioned, and the eating is the reinforcement. The conditioning process came into prominence in American psychology through the work of Watson who saw in it not only an escape from the vagaries of introspection and sensationalism but also the possibility of a science of psychology as objective as physics, the key to habit-formation or learning, the secret for the control of emotions and attitudes, and a realizable hope of predicting and controlling human behavior. Hilgard and Marquis do not regard conditioning as another name for association nor as representative of all forms of learning. They also do not regard a habit as a chain of conditioned responses and they disclaim the conditioned response as the unit of habit and the conditioning experiments as directly applicable to complex habit situations.

The conditioning experiment, because of its simple and well controlled structure, is a fruitful source of postulates from which deductions can be made concerning complete learning. The postulates must be verified in their new application; it is not enough to know that they were found true in simple conditioning (pp. 21-22).

Such deductions are made in the chapters on serial learning, problem solving, voluntary action, and personality, but not until after seven chapters are devoted to a discussion of the facts and principles of conditioning.

These chapters are on classical conditioning experiments, instrumental conditioning experiments, the nature of reinforcement, the nature of extinction, strength of conditioning, gradients of reinforcement, and generalization and discrimination. The chapter on classical conditioning experiments is a review of the work of Pavlov and of the type of experiments made by him. The authors describe the types of reactions that have been used in conditioning experiments, the unconditioned stimuli, the conditioned stimuli, the characteristics of the conditioned response, and define the Pavlovian types of inhibition. Conditioned responses can be formed in all types of animal organisms from protozoa to the highest type of mammal. With few exceptions almost any response from a glandular response such as salivation to a smooth-muscle reflex such as the pupillary reflex can be conditioned, and the conditioning stimulus may be in any sensory mode. The conditioned response is very similar to the unconditioned except that it is slower and reaches its maximum extent more gradually. It may be extinguished by failure to reinforce, but after an interval of rest it recovers spontaneously. Under instrumental conditioning the authors discuss those experiments in which the conditioned response is completed before reinforcement occurs. Four types of procedure are described: (a) reward training, in which the conditioned response is followed by a positive incentive such as food, as in Thorndike's experiment with cats trained to escape from a puzzle box; (b) escape training, in which the conditioned response is followed by the ending of a painful stimulus, as when a rat terminates a shock by pulling a loop; (c) avoidance training, in which the conditioned response prevents the occurrence of a painful stimulus, as when a guinea pig learns to run out of a pen

during a time in which a buzzer sounds; and (d) secondary reward training in which the conditioned response is followed by a token or poker chip which has acquired reward value in previous experiments. In this case the reinforcement is said to be derived. In the chapter on the nature of the reinforcement the concept of reinforcement is stated to be basic in the conditioning process because the conditioned response is strengthened by reinforcement and weakened by non-reinforcement. Three principles are given to explain the results of reinforcement, substitution, effect, and expectancy. The principle of substitution states that a conditioned stimulus occurring at a time when an unconditioned stimulus provokes a response tends upon recurrence to provoke that response. The law of effect states that a response is strengthened or weakened according as it is followed by satisfaction or annoyance. The principle of expectancy states that reinforcement must be such as to confirm an expectancy. The law of substitution is applicable to classical conditioning; the law of effect to instrumental conditioning or trial-error learning, and law of expectancy to escape training or secondary-reward training. In the chapter on the nature of extinction, two principles of interpretation are discussed, adaptation or decrease of a conditioned response because of the repetition of the conditioned stimulus without reinforcement, and interference or the decrease of the response because of the formation of competing tendencies. Extinction is a form of inhibition because the response spontaneously recovers during a period of rest and for the same reason it is not a case of forgetting. Under the heading of gradients of reinforcements the authors discuss the temporal relations between the conditioned and the unconditioned stimulus and the relations of the goal and of reward to the learning activities. The nearer the conditioned stimulus is to the unconditioned stimulus up to .5 seconds preceding it the more effective it is, and the nearer an act to be learned is to the goal or to the reward the more easily it is learned. In the chapter on generalization and discrimination the two terms are distinguished, the former referring to the tendency of an animal to give a response to a stimulus similar to the one to which it was trained and the latter to the ability to respond positively to one stimulus and negatively to a similar stimulus. The similarity may be a partial identity, or a similarity of sensory mode,

form, feeling, or meaning. Discrimination occurs only when one stimulus is reinforced and the other is not.

In the chapters on serial learning, problem solving, voluntary action, and personality an effort is made to explain these more complicated activities by conditioning principles. In serial learning the kinesthetic sensation provoked by the response made to the initial stimulus becomes the conditioned stimulus to the next and subsequent responses. The elimination of wrong or circuitous responses is explained in terms of the goal-gradient hypothesis. The movements leading through a short route to a goal become more strongly attached to the goal than those for the long route and consequently become dominant. In learning a row of nonsense syllables, each syllable becomes a conditioned stimulus not only for the next syllable which is simultaneously conditioned but also for all later syllables in the series which have the nature of trace-conditioned responses. The difficulty of learning the middle of the series is due to the fact that trace-conditioned responses accumulate most heavily in the middle and act as inhibitions to the simultaneously conditioned responses. Although the goal-gradient hypothesis is helpful for understanding the elimination of certain errors it is also responsible for creating others, the tendency to enter more frequently blind alleys in the direction of the goal than those away from the goal.

A scientific explanation of problem solving presupposes continuity with past experience. This assumption is made even in logical reasoning. When one reasons from the concept of the mortality of all men to the conclusion that Socrates is mortal, he does it through the concept of man, which is the intermediate connection between the new and the old. An explanation of problem solving on the basis of the principles of conditioning requires the finding of an intermediate conditioned response which connects the old with the new. This has been found in what conditioners call the fractional anticipatory goal response, *R_g*. A hungry rat has been taught to go from *R* or *U* to *X* for food. When thirsty he has been taught to go from *R* to either *U* or *H* for water. Later when hungry if placed at *R* and the path from *R* to *X* is barred, will he turn to *U* or to *H*? According to the goal-gradient hypothesis, he will go to *U* and then to *X* because the anticipatory goal responses from *R* to *U* and from *U* to *X* makes the path *R-U-X* stronger than the path *R-H*. This has not

been proven experimentally but it has been shown that if a subject has been conditioned to give an eyelid reflex to a light by means of a strike on the cheek, and later conditioned to give a finger withdrawal to a shock accompanied by the strike on the cheek, he will give the finger withdrawal reaction to the light, although this response was not made to light before. In this case the eyelid response may serve as the intermediate term. This is a sample of the application of conditioning principles to problem solving.

Just as a scientific explanation of problem solving presupposes continuity between new and old reactions so does a scientific explanation of voluntary action. It has been shown that the pupillary reflex, which is not subject to voluntary control, can be conditioned to the sound of a bell combined with a light stimulus. It can also be conditioned to the subject's command, "contract" combined with bell and light. Later the reflex can be made to respond to the command, "contract," when given alone, even if it occurs subvocally. Similarly it has been shown that if a subject says "dilate" each time he puts his arm into warm water, he later can cause his blood vessels to dilate upon the command when given alone. This suggests that the secret of voluntary control lies in the manipulation of the stimulus to which the response is attached. But what makes one manipulate the stimulus, that is, give the commands, "contract," or "dilate"? This the conditioners do not know.

In the chapter on personality the authors discuss experimental neuroses, conditioned emotions, psychotherapy, individual differences, and clinical types. Experimental neuroses are due to conflict, not the Freudian type, but to a problem too difficult for the animals to solve. With respect to conditioned emotions, the authors point out that the famous Watsonian experiment with Albert and the rat has been a failure in the hands of other experimenters and that the exaggerated hopes that it occasioned should be corrected. Equally important is the factor of maturation. A case is reported in which a hysterical patient was cured of paralysis and anaesthesia of the left arm by conditioning methods. In the discussion of individual differences it is pointed out that the conditioning process varies much with the individuality of the subject, and that conditioners as well as psychiatrists have discovered that clinical types are also closely related to the character of the individual.

The last chapter of the book devotes 31 pages to the neuro-physiological mechanism of conditioning. The most important conclusion is that this mechanism is not understood for even the simplest case of learning. The anatomical locus is central. For normal conditioning it is cortical, but it can be subcortical. The association path appears to lie outside of the main path connecting the conditioned response, the unconditioned stimulus, and the conditioned stimulus. Investigators of the conditioned response have not yet been able to go beyond speculation regarding the nature of synaptic modification.

In evaluating conditioning principles as an explanation of learning and as a source of recommendations for practical problems in learning the authors say that they are helpful only within narrow limits. Deductions from conditioning principles can never displace empirical results and factors derived directly from the problem at hand. So long as conditioners have not yet been able to account fully for such a simple type of learning as running a maze, one needs to be cautious about using conditioning principles for solving more complicated problems.

Such is the modest conclusion derived by the authors from a critical study of over 900 experiments on conditioning, most of which have been made since Watson announced his ambitious program in 1916. If the results are disappointing, the authors are at least to be complimented for their scientific treatment and for not making claims that are unwarranted by the facts so far established. The book is compact and rather difficult reading, but it is critical and clear. Technical terms, of which there are many, are explained not only in the text but also in a glossary near the end of the book. The chief value of the book to the educator is its service as a model of scientific procedure and judgment. As a textbook for a course in the psychology of learning it is wholly inadequate if the purpose of such a book is to give the student an understanding and a control of the learning of skills and of meanings as they are taught in the schools. In fact the book has little contribution to make toward such a purpose, and it is probable that the authors would disclaim its usefulness for this purpose. They wish only to give a critical exposition of the main facts of conditioning and to point out their relation to the theory of learning. In this they have done an excellent job, yet the reader is disappointed at the smallness of the contribution. The conditioners

have shown the universality of such factors as drive, contiguity of stimuli or cues, repeated response, and reward in learning throughout the animal kingdom and that they operate not only on the verbal level but also on the sub-verbal and even subconscious levels. This is interesting but how does it help the teacher solve actual learning problems, for example, teach Ivan Rojurski the principles of English grammar, use grammar to eliminate his bad sentence structure, eliminate his foreign accent, use his knowledge of Polish to help him understand English, get an understanding of the principles of democracy and develop a genuine enthusiasm for them, discriminate between truth and propaganda, stop worrying over his poor grades in English, and what to do to keep his mother from being lonesome in her newly-adopted country? In spite of the thousand experiments on conditioning, there is still much to be learned about learning. The authors of *Conditioning and Learning* do not claim that experiments in conditioning have anything to offer for the solution of such problems but the fact that they have not, makes one wonder whether these investigations have not gone off on a tangent.

Fort Hays Kansas State College
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THE MODIFIABILITY OF PLAY BEHAVIOR WITH SPECIAL REFERENCE TO ATTENTIONAL CHARACTERISTICS*

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HELEN THOMPSON

A. INTRODUCTION

In a current publication (3) the play behavior of a pair of identical twins, *T* and *C*, has been compared at successive ages from the time the twins first began to combine objects at the age of 42 weeks until they reached the age of 10 years. Their play at each age was found to be so similar in interests, and in tempo and type of activity, that observed separately it would have been difficult to identify one twin from the other; but when the records were comparatively studied, slight differences in attentional characteristics were found to persist from age to age.

By the time the twins were three years old, these differences were recognized as being relatively fundamental. The differences were generally characteristic of the twins. We wondered if they could be modified by training. Observation and testing were continued in order to understand the nature of the dissimilarity. Finally, when the twins were 3 years 7 months of age, an experimental training schedule designed to alter their behavior traits was planned. The experiment was concluded in 1931 but report has been delayed until now in order to gain perspective and to study the twins' subsequent development.

Prior to the study reported here, *T* and *C* had been subjects for two other studies, one when they were infants between 46 and 55 weeks of age; the second when they were between 18 and 21 months old.

In the first study (2) *T* was trained 20 minutes on six days a week in cube play and stair climbing between the ages of 46 and 52

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weeks. Twin *C* was similarly trained between 53 and 55 weeks of age. It was shown that practice in stair climbing and cube building, in the nascent stages of growth, did not transcend maturation; that practice, delayed until the organism was more mature resulted in more rapid acquisition of skill; and that the resulting behavior pattern was influenced to a certain extent by the stage of growth with which practice was associated. The specific effects of the training ceased to be apparent nine months after training was discontinued.

The second study by Strayer (5) showed that also in the field of vocabulary development maturation played a highly important rôle. The twin who received delayed training learned more rapidly even though there was a difference of only five weeks in time of initiating the training. The effects of the differential training had completely disappeared prior to the present study.

Both of the previous studies were concerned with the question of maturation and learning. The present study relates to the modifiability of behavior characteristics. Discipline in force from the cradle to maturity is designed to modify personality traits. How effective is this discipline? Can, as Watson claimed, any trait be modified? Can the leopard change his spots? These questions are unanswerable in generalities, but study and experiment can produce specific replies. It is toward that aim that this experiment has been directed.

The study also indicates the value of play observation in the study of attentional characteristics. Play behavior is receiving considerable notice today both from psychologists and psychiatrists particularly with respect to analysis and therapy. If play can be used to reveal fundamental patterns of attention its importance as a diagnostic tool will be considerably increased.

B. THE SUBJECTS

T and *C* were the first offspring of Italian parents residing in modest circumstances in New Haven, Connecticut. *C*, the first-born, weighed 5 pounds 3 ounces; *T* weighed 5 pounds 6 ounces. A month after giving birth to the twins their mother died of septicemia. When the twins were six weeks old they were transferred from the hos-

pital to a child caring institution where they remained until they were 2 years 2 months old. Their father then remarried and re-established his home. At the time of this study the twins, age 3 years 7 months, were living at home and regarded their stepmother as their own mother. Evidence for the high degree of identity of the twins is given in previous publications (2, 3).

Their intelligence rated low average or dull normal. They were normal, active, and responsive preschoolers. They regarded their visits to the Clinic with pleasure and were disappointed when any illness intervened. Slight differences in behavior characteristic had existed from the time of our first observation, when the twins were six weeks old. For a full description of the genetic trends of the differences the reader is referred to the monograph, reference (3). The comparative record of their behavior at the age of 3½ years, just prior to the experiment, defines their similarities and differences (Table 1).

In summary, although *T* and *C* were remarkably alike, *T* had better postural control and was more grossly active. *T* was also a little more adaptively competent in performance tests. *C*, on the other hand, had slightly better manual control and enjoyed, more than did *T*, activity represented by writing and putting things neatly away. *C* was more vocally expressive; also she tended to dominate *T* in a pleasant but persistent manner. *T* was the more coöperative but gave evidence of being thwarted by *C*'s domination.

These slight differences were highly consistent with the initial differences in "perseverative tendency" and in play which are discussed fully under the section *Results* to facilitate comparison with behavior following training. In the perseveration tests *C* spent longer than *T* with each toy. The play differences were as follows:

1. *T* responded overtly more immediately than *C*.
2. *T* responded more discretely to one aspect of the situation; while *C* responded, more than *T*, to the total situation.
3. *T* exploited the situation more diversely while *C* tended to marginal diversions with more limited and repetitive exploitation.
4. *T* shifted her activity more completely, more decisively, and earlier than *C* while *C* tended to retain an interest in one toy as she shifted her activity to another.

TABLE 1
COMPARISON OF BEHAVIOR JUST PRIOR TO TRAINING: AGE 3½ YEARS

Test	T	C
<i>Postural Activity</i>		
Walking on alternate blocks (Each twin was tested twice)	Stepped alternately as directed Enjoyed the test Required help and encouragement in piling the blocks	Stepped with both feet on each block Tried to avoid the game by asking for the toilet Willingly piled the blocks neatly after finishing the test
Stepping with alternate feet in rings	Neither child stepped Feet touched the rope on all but one occasion	with alternate feet Placed feet carefully, avoiding touching the ring
Rolling balls up an inclined plane	Threw ball so that it bounced	Rolled ball according to direction
General demeanor	More active	Less active
<i>Manual Activity</i>		
Tracing diamond and cross	Stopped when came to starting place Line more broken Made more effort in accuracy Tries hard but it appears to be hard for her	Continued making second circuit Line more continuous Added marks to paper after she had finished Obvious pleasure in activity
Use of forceps	Grasp: Index finger tightly along pencil. Right hand used. Used right hand A little less skillful in using forceps	Grasp: Adult manner, relaxed grasp. Right hand used. Some tendency to use left hand Placed sticks more accurately than T
	Both enjoyed task greatly	
	Works 4 minutes at task Looks to examiner for approval	Works 7 minutes at task Appears less anxious for approval
<i>Language</i>		
Picture cards (Gesell)	Named 8 Failed star leaf	Named 7 Failed star leaf book
	Called it ? feather	Called it picture picture picture

TABLE 1 (*continued*)

Test	T	C
Detroit B	Correct 4; doubtful 2 <i>Failed</i> flies burns cuts blows shoots melts	Correct 5 <i>Failed</i> flies burns cuts shoots melts <i>Called it</i> firestone cat doggie band cat
Prepositions	Both understood "on" and "under" Both failed "in back of" and "beside" In general C was the more talkative and the more verbally expressive twin	
<i>Adaptive Behavior</i>		
Block building		
Spontaneous	Arranges all ten in a neat row	Arranges all ten in a neat row
Train	Immediate conventional response	Immediate conventional response
Bridge	Imitated, leaving space between lower blocks	Blocks together; corrected as soon as asked if exactly like model
Gate	Duplicated model	Put two upright blocks beside base block
Formboard (Gesell)	Adapted more quickly	
Color forms (Gesell)	All correctly identified	Failed one. Put triangle on square
Binet shapes	Correct: 6	Correct: 8
Draw man	Three circles	Three circles with line emanating upward
Incomplete man	Named it: "A doll"	Named it: "A man"
Imitation: circle cross	Horizontal oval Two vertical lines one horizontal (?A)	Horizontal oval First trial, lines 2nd & 3rd trials: good imitation
<i>Social Behavior</i>		
Tested by 7 minutes' play together	More physically aggressive Gave orders once Usually complied with C's orders; once delayed; once rebelled, saying "No, no" Showed greater emotional expression	Dominated situation by pleasant persuasion. Gave orders six times More controlled emotionally

5. *T* was more generally active during exploitive play while *C* was more constrained.

These differences were observable from infancy and persisted in spite of differential training first in cube play and then in vocabulary development, as the following examples testify. More complete documentary evidence is given in the recent monograph (3). The first difference, that of immediacy of response, is descriptively evident in the protocols of play behavior but is more convincingly demonstrated by cinema analysis of other situations (2). The evidence will therefore not be presented here. Naturally all of the differences listed above are not apparent at each observation. The following examples show in what way these differences manifested themselves in infancy and early childhood.

C. EXAMPLES OF PLAY CHARACTERISTICS IN INFANCY

1. *Age, 42 Weeks*

Toys: saucer, paper, string, spoon, cube, and rod. Both children gave attention first to the saucer. *C* lifted the saucer and then the rod. She banged the rod against the cube and then against the saucer. *C* ignored spoon, string, and paper. *T*, in a shorter period of time, after attending to the saucer, picked up the rod, released it; picked up the paper, waved it; picked up the rod, released it; then transferred the paper from hand to hand three times and brushed it against the saucer. *T* ignored cube, string, and spoon. *T*'s activity shifted from her original regard for the saucer, to the rod, and to the paper; while *C*'s activity centered about the saucer. *T*'s actual activity was more varied than *C*'s, although both twins ignored three of the six objects.

At the same age when *T* and *C* were given the 10 cubes, *T* prehended one cube after the other; while *C* tended to grasp and re-grasp the same cube.

T's more far-reaching postural activity at this age was shown by her leaning over to grasp the side rails while *C* scratched the blotter beneath her.

2. *Age, 44 Weeks*

Toys: saucer, paper, string, spoon, cube, and rod.

Given the multiple objects both *T* and *C* gave major attention to the paper: *T* reached underneath for the paper while *C* first briefly manipulated the rod and spoon which lay on the paper. After *C* secured the paper, she manipulated it almost exclusively, only momentarily diverting her attention to the cube. *T*, on the other hand, diverted her attention more completely to the rod, hitting it against the paper, dropping it, regrasping it, and transferring it. When this situation was re-presented, *C* immediately removed the small objects on the paper and manipulated it; while *T* did likewise, but also grasped the spoon and hit it against the paper.

It was not until *T* and *C* were 46 weeks old that differential training in cube play and stair climbing was imposed. Any differences in the above behavior patterns are either native or acquired in the normal course of their growth. These characteristic play patterns survived the cube play and stair climbing training begun at the age of 46 weeks in spite of certain minor modifications in their social adjustment.

3. *Age, 48 Weeks, After Two Weeks of Directed Cube Play*

Toys: same as at 44 weeks. *T* again played more discretely with them, exploited them more diversely, shifted her activity sooner, and more completely than *C*. Although both twins attended to first one object and then another, *C* showed a little more continuity in her play.

Toys: ten cubes. Both *T* and *C* at first tended to pick up one cube after another, then *T* put one cube upon another, transferred cubes to platform, patted the crib rail, banged with a cube at the crib rail, and offered the cubes to the examiner; while *C* held a cube above the table and dropped it, pushed a cube with her index finger, and then grasped the cube, brushing it from side to side, and off the table. In spite of the two weeks of daily cube play which had lessened *T*'s interest in the cubes and which was designed to train in construction and combining play, *T* changed more abruptly than *C* from one type of manipulation to another and exploited the situation more diversely as she did before the training.

4. *Age, 52 Weeks, After Six Weeks of Directed Cube Play*

Toys: cup and spoon. In spite of the fact that *T* had now be-

come more socialized than *C*, so that she spent more time than *C* in social behavior and less time in exploitive play, *T* still retained her former play characteristics. *C* directed her attention exclusively to hitting the spoon on the cup. In doing so she hit the cup out of reach, reaching for it, and was persistent in her attempts to secure it. In an equal time period *T* grasped cup and spoon, offered them to the examiner, banged the cup on the table, rubbed the spoon over the table, and hit the spoon on the cup.

Again, the differential language training by Strayer when the twins were between 18 and 21 months old did not alter their slight characteristic differences even though their social responses to *LCS* were modified. At the age of 20 months each twin was observed separately for 10 minutes in the nursery playroom by *LCS* who remained in the room but busied herself with note taking.

5. Age, 20 Months

Both twins, on entering the room, went to the blackboard. *T* picked up the basket of chalk, took one piece out, offered it to *LCS*, put it on the floor, dumped the chalk out on the floor, replaced some, left the rest on the floor and walked across the room, putting the basket with the chalk on the floor. She left it there and went to the pool, and played with some sticks. From the pool she went to the steps, sat beside *LCS*, walked up and down the steps, vocalized, then abruptly crossed the room to inspect the pictures on the screening. From there she went back to the pool, carried the stools from there to the steps. Left the stools by the steps. She then went to the doll furniture and transported one at a time three doll chairs to the child's chair, piling them one on top of the other. The basket of crayons which she had earlier left near here was then placed on top of the chairs. She then dropped the chalk from the basket to the floor and then removed the basket and tried to replace the crayons. Before finishing, she carried the basket of chalk to the doll furniture place, noticed that her hands were dirty and showed them to *LCS*. She then went up and down the steps and sat on the bottom step. In a second she got up, walked to the pool, brought a stool to the steps, sat down and put her feet on it; then got up, pushed the stool, picked up a piece of chalk, dropped it, went to

the pool, picked up two sticks, hit them on the floor, carried them to the screening, hit them against the pictures, went back to the stool, hit the sticks on the floor, on the stool, vocalized, put the sticks down, went to the pictures, went to *LCS*, vocalized, and walked up and down the steps.

In comparison, *C* picked a piece of chalk from the basket, took it with her to the table where she picked up and replaced first a putty block, then a roller. These she carried to *LCS*, offering them to her. Getting no response she walked back to the blackboard, put the roller on the ledge, walked to the table, put down the block, and then went to the box of large blocks, and selected an orange block. This she offered to *LCS*, then carried it to the blackboard. At the blackboard she sat down, placed and replaced block on stool and ledge. She then picked up the basket of chalk, put piece of chalk on block, notices chalk on hands, and replaces chalk in basket. Looked at *LCS*. Then got up, carried basket to table and sat down. She continued to sit there the rest of the time, placing and replacing the basket, the chalk, and the blocks on the chair and on the table; placing and replacing chalk and crayon in the basket. Once she made a tower of four blocks and twice she jabbered as she played.

6. Summary

T was obviously more grossly active than *C*. *T* transported the stools and the doll chairs and the basket of chalk, while *C* transported one fairly large block, the chalk and the basket. *T* sat only momentarily as though to rest and look about, while *C* sat most of the time playing. *T* piled doll chairs; while *C* piled small blocks.

T played with one thing, then left it and turned her attention apparently completely from it. *C*, on the other hand, tended to retain what she was playing with and thus make less abrupt transitions. In attempting to analyze their play, clear cut demarcations were easy to make for *T*'s play activities, but not so for *C*'s.

T engaged in a greater variety of exploratory activities while *C*'s activity had a more repetitive character. These play pattern differences continued.

At the age of three years *T* and *C* were observed in the playroom together for 25 minutes. Their behavior compared as shown in Table 2.

TABLE 2

	<i>T</i>	<i>C</i>
Number of activities	39	31
Number of objects contacted	19	12
Number of words spoken	218	215
Questions about new objects	4	1

T was more alert to her environment and exploited it more completely. Her play was less integrated than that of *C* as shown by the fact that *T* tended to drop what she was doing and give her attention more completely to her new interest; while *C* integrated her original interest with the new. *C* kept the doll continuously with her, while *T* discarded the doll for the cart. Thus, up through three years of age *T*'s and *C*'s characteristic differences in attentional characteristics during play were those listed above.

D. THE TRAINING PROGRAM¹

The training in play activity was designed to channelize *T*'s play, to keep her at whatever task she started, to prevent her more rapid activity shifts, to minimize her postural activity diversions, and to help her relate her activities into an organized whole. Obviously these are not mutually exclusive aims just as the differences between *T* and *C* were not mutually exclusive traits.

1. Procedure

Twice a week the twins were brought to the Clinic for a 45-minute play period. They were taken to duplicate rooms, one the complete mirror image of the other even with respect to windows, radiator, and doors. They were supplied with duplicate toys. Each twin was accompanied by an adult who kept a detailed and timed activity record, supplemented with notes concerning help, suggestion, encouragement, and disregard or denial on the part of the adult.

The adult with Twin *T* gave encouragement lavishly; helped her when she encountered a task beyond her knowledge or ability; suggested further activity whenever she started to divert; and accompanied any denial with a positive suggestion. The adult with

¹The author is indebted to Dr. Vernon Lytle and Mrs. Maud Lytle for the actual training of *T* and *C*.

Twin *C* remained as far as possible neutral; denials were not accompanied by a positive suggestion; help was given only rarely.

2. *Example of Training Methods*

a. Help. Held doll, untangled or straightened toy object, moved chairs, or otherwise gave actual assistance. Help given to *C* was always solicited; to *T*, not necessarily solicited.

b. Suggestion. Any comment such as "*you can . . .*"; any suggested play either given verbally or by action. To *C*, such suggestions were as follows: "*You'll break it.*" "*Careful.*" "*Lace your shoe.*" "*You do it,*" in response to a request. To *T* the suggestions were directed to her constructive activity, such as "*Let's wash the dishes.*" "*Put these in place.*"

c. Encouragement. This included such comments as "*That's fine.*" "*Good.*" "*Yes, that's right.*" Coöperative play such as pretending to drink, "*If you want to.*" "*You did it,*" or, "*I like your beads,*" or any other expression of approval such as a smile or a nod.

d. Denials. These consisted of (*a*) disregarding the child's questions, (*b*) responding with "*I am busy,*" "*Don't bother me,*" "*Please don't,*" "*No,*" or "*When we get through,*" and (*c*) gently pushing the child away, or otherwise restricting activity.

Tests were given from time to time to ascertain the effect of the training. As the training progressed, the toys were changed, and the training was conducted in different rooms and by different people in order to generalize its effect in so far as that was feasible.

Table 3 gives the specific dates of training and the toys used. There were altogether 25 training periods. It must be recognized that when the effects of the training carried over to the testing periods, they too became training periods, even though adult supervision was not imposed at that time.

3. *Statistics Concerning Comparative Training*

In order to ascertain how different *T*'s training experience had been from that of *C*'s, the records have been studied and the actual frequency of help, suggestions, encouragement, and denials tabulated (Table 4).

TABLE 3
THE TRAINING SCHEDULE

Date	Toys	Comment
1931		
2- 2	Housekeeping: doll, doll clothes, carriage, blanket, dishes	
2- 5		
2- 9	Concentration toy added	
2-12	Housekeeping and concentration toy	
2-16	"	
2-19	"	
2-24	"	
2-27	"	
3- 3	"	
3- 6	"	Adult with <i>C</i> changed
*		
3-13	"	
3-17	"	
3-20	"	
**		
4- 2	"	
4- 6	Above toys replaced with three new ones	
4- 8	Three new toys	
4-10	"	
4-14	"	
4-17	"	
4-24	"	

5-20	Housekeeping toys and concentration toy	
5-22	Above toys replaced with three new toys	
5-26	"	Adults interchanged continued
5-29	"	
**		
*—Children ill with cold		
**Testing program		
***—Twins kept home because of measles		

It will be seen that for the seven initial periods *C* actually did receive some positive aid, although comparatively this was much less than the aid given to *T*. As the training progressed, it was less necessary to aid or deny either child, since they learned to adapt their behavior to the conditions.

4. Response to Training

During the early part of the training *T* was dependent on the adult for suggestions; then, when she no longer needed suggestions, she still sought approval (see Table 4, under *S* and *E*). She was

TABLE 4*
FREQUENCY OF AID AND DENIAL DURING TRAINING PERIOD

H = help; *S* = suggestion; *E* = encouragement; *H-S-E* = total aid;
D = denial

Date 1931	<i>T</i>					<i>C</i>				
	<i>H</i>	<i>S</i>	<i>E</i>	<i>H-S-E</i>	<i>D</i>	<i>H</i>	<i>S</i>	<i>E</i>	<i>H-S-E</i>	<i>D</i>
2- 2	6	18	2	26	—	5	1	1	7	3
2- 5	4	13	2	19	—	2	1	0	3	2
2- 9	4	4	6	14	1	0	0	0	0	6
2-12	11	9	4	24	—	2	1	—	3	13
2-16	11	17	2	30	—	2	2	3	7	4
2-19	6	23	4	33	—	2	2	—	4	6
2-24	8	17	4	29	1	6	3	2	11	11
2-27	7	14	4	25	—	2	1	3	6	6
3- 3	2	25	15	42	—	—	—	—	—	19
3- 6	5	6	13	24	6	1	—	—	1	48
3-13	7	9	10	27	—	—	—	—	—	12
3-17	8	2	10	20	3	—	—	1	1	3
3-20	5	3	8	16	—	—	—	—	—	10
4- 2	7	8	5	20	2	—	1	—	1	4
4- 6	7	2	—	9	2	—	—	—	—	0
4- 8	5	3	5	13	1	1	—	—	1	3
4-10	3	1	—	4	—	1	—	—	1	4
4-14	2	4	3	9	—	—	1	—	1	4
4-17	8	3	—	11	—	1	—	—	1	1
4-24	7	5	—	12	—	—	—	—	—	11
**										
5-20	2	4	4	10	4	—	—	—	—	2
5-22	3	8	3	14	3	—	—	—	—	0
5-26	2	—	5	7	—	—	—	—	—	3
5-29	1	2	—	3	—	—	—	—	0	0
6- 5	—	1	1	2	7	—	—	—	—	4
Total	131	201	110	443	30	25	13	10	48	179

*The records were analyzed and checked by Dr. Frances M. Clarke.

**Children had the measles.

gradually weaned by being denied that approval when it was sought, and given spontaneous approval for independence. She finally responded to the training by prolonged industrious and concentrated play.

C, during the early part of the training, played with the toys briefly, then used every common device to attract attention; she talked to the adult with her, she became over active in her play; she shouted, she sang, she leaned against the adult watching her write, she pulled at the observer's pencil, she tried to sit in the observer's lap, she threw the toys, and she asked to see her twin and to go to the toilet. In spite of the futility of her attempts she

was always as eager as *T* to come to the playroom. She acquired independence in her play sooner than *T*; her imaginary doll play became elaborate as she reenacted her home life; she carried on long conversations with herself and she recited repetitively rhymes and songs in a jargon fashion. She did continue occasionally to seek release by requesting the toilet, probably because this was the one "out" which was occasionally conceded.

E. THE RESULTS

The changes in *T*'s and *C*'s behavior, following training in play behavior, were measured in two ways. First, by means of scores on the Cushing *Test of Perseverative Tendency* (1) and second, by analysis of the play records. In addition the records have been studied for clues as to the significance of the resulting changes. While the objective records show well-defined modification, closer scrutiny indicates that the change was not as fundamental as might at first appear to be the case.

1. *Tests of Perseverative Tendency*

Test scores on the Cushing *Test of Perseverative Tendency* before and after training are given in Table 5. In this test the child is presented with a toy, its action is demonstrated, and the child is then given the toy and permitted to play with it as long as she will. Time and behavior are recorded.

Prior to training, *C*'s time score was definitely longer than *T*'s. The only exception was in the visual test, one month prior to training. On this occasion the visual stimulus followed the motor test to which *T* had attended for 11 minutes, as opposed to *C*'s 3 minutes 50 seconds response. Furthermore, *C*'s total perseveration time was 17 minutes 50 seconds as opposed to *T*'s 12 minutes 35 seconds.

After 17 training sessions scattered over a period of two months this tendency to persevere as measured by the test was reversed. The reversal was most pronounced on the tests given six months after the training had ended. The most striking incident was when *C*, who was tested first, spent 27 minutes putting marbles into a box; while *T* spent 1 hour 59 minutes (119 minutes) at the same task. It was observed, however, that although *T* spent an abnor-

TABLE 5
PERSEVERATIVE TENDENCY TEST
(Scores in minutes (') and seconds ("))

Age Yrs. Mos.	Training	Motor		Visual		Auditory		Total	
		T	C	T	C	T	C	T	C
3	+5	1½ mos. before training	6'	14' 0"	45"	1'	2'45"	8'42"	32'25"
3	6	1 mo. before training	3'50"	11'	5'30"	3'15"	4'10"	12'35"	17'50"
3	9	After 17 training periods	24'	3'	7'30"	9'	10'45"	34'	25'15"
4		After 4 mos. of training 1 mo. of rest	10'	8'	2"	6'30"	19'30"	45'47"	36'30"
4	6	6 months after training	13'	4'30"	9'45"	6'5"	27"	114'30"	39'52"
5		1 year after training	14' 2"	9' 5"	5'20"	2'14"	24'15"	101'	46'51"
5	4	1 year 4 mos. after training + Kindergarten experience	15'15"	1'55"	4' 5"	3'	77'	113'45"	103' 1"

mally long time at the task, she varied her method by hitting the marbles in, tipping the box so that they would roll within, bouncing them in, and using other diverse means of inserting them; while *C* tended to use just one method. In other words, *T* had been trained to remain with the task at hand, but within this field of activity she still varied her performance and attention. On the follow-up tests of perseverative tendency *T* continued to score higher, that is until the twins attended kindergarten. Then the differences were practically eradicated.

Another evidence of the nature of the modification in behavior due to training is seen in that part of the perseveration test using the Porteus Maze. One month after training, *T* spent 33 minutes 15 seconds at the task; *C*, 19 minutes 30 seconds. Although both twins used 13 sheets of paper, *C*'s response started to deteriorate on the ninth trial, while *T* continued. *T*'s papers had more marks on them but her marks were related to the mazes, while *C*'s were writings on the margin of the paper and apparently unrelated. The training had influenced *T* to keep at her task even though it was once completed, while *C* resorted to unrelated activities as she had been permitted to do in the training period. Although *T* kept at the task, she was still a little hurried and careless in the initial execution of the task as she had been formerly.

The following examples of the differences in the behavior of the two children before and after training are taken directly from the record of their responses to the motor toy.

a. Response to Motor Toy.

(1). *One and a half months before training.* *C*'s interest grew slowly and diminished slowly. At first she stood quietly and watched the toy; she vocalized; she fingered it; she watched it intently for a fairly long period; then she stood back from the toy watching it. Nine minutes 30 seconds after the toy was first presented, she reached the highest point of her enjoyment; she stood back to admire it and excitedly said, "*Look, look.*" From this time on her interest slowly waned. From running back and forth, she crawled back and forth; more and more she gave her attention to the clamp holding the toy, to the blotter, the table and to the ob-

server. Fourteen minutes after the toy was presented she finally expressed satiation with it.

T, on the other hand, began to manipulate the toy even before it had been demonstrated. She immediately became excited, saying, "*Look, look*" as her twin had done later in the test. When the mechanism became stuck, *T* became excited, while *C* took the difficulty calmly. At the end of six minutes *T* was finished with the toy. Her interest turned from it rather abruptly.

(2). *One month before training.* *T* spent 3 minutes 40 seconds with the toy while *C* spent 11 minutes—almost three times as long. This time both twins responded to the toy promptly but *T* interfered with the toy's action more than *C*; while *C* spent longer than *T* merely watching the toy operate. Again *T* lost interest abruptly, while *C* slowly diverted her attention.

(3). *After seventeen training periods.* *T* now spent 24 minutes, while *C* spent only three minutes with the toy. The effects of the training on *T*'s behavior were obvious. She repeated each activity many times, sat and watched the toy spin, moved the table over against the wall to stop the spinning, looked under the table to investigate the source of the sound, clapped her hands in obvious enjoyment saying, "*Make a lot of noise.*" "*Rota, rota, rota, rota,*" imitating the sound, noticed the small pictures of a boy and girl on the toy and identified them with "*Jack and Jill.*" *T*'s training had taught her to be more observant, and to keep her interest in the object of her play; but within the narrowed field of interest she still varied her activity in her characteristic way, doing one thing and then turning her attention to a different aspect of the situation. *C* continued to repeat her activity and to return to a former interest.

(4). *One month after training was discontinued.* *T* spent 10 minutes with the toy; *C* spent 8 minutes with it. Although *T* had mosquito bites on her leg which were diverting, she became absorbed in her play with the toy, then abruptly and characteristically rejected it. *C*, on the other hand, characteristically showed a gradual loss of interest. She talked about a party and then about other children, indicating that her interest in the toy was not wholehearted absorption.

(5). *One year after training.* Differences in perseveration

time were still pronounced. However, the differences characteristic of the twins from the beginning were apparent, even in spite of the fact that *T* spent 14 minutes 12 seconds with the first toy; while *C* spent only 9 minutes 5 seconds with it. The actual behavior records are shown in Table 6.

TABLE 6

<i>T</i>	<i>C</i>
At first watches toy passively. "Oh, they're all going after that other. Now they stop," as she re-winds. Talks about finger burning—briefly. Is much quieter than <i>C</i> was. Pays attention to the business at hand. <i>T</i> talks very little in comparison. Watches intently. "You know when you put it a little further it stays going when it goes." She looks to see how it is fastened on. "This stayed long, huh?" Watches intently again for 10 minutes, then tells about uncle, then sings in a monotone about a pickle. At this time her interest is very similar to <i>C</i> 's.	"I know how to do that," fixes it. "I bet it stops all by itself." She talks steadily about going swimming, her uncle, her mother. Half-heartedly she watches the toy, talking all the time. Actually much less interested in the toy than in talking. "You know what I want to play with today. Ball." A steady chatter. Tries to get the examiner to talk by enticing her into a guessing game. Finally sings, "I don't want to play with this no more."
After 14 minutes 12 seconds, finished.	After 9 minutes 5 seconds, finished.

This test was administered by Hilgard who had had no previous contact with the study. In her monograph (4, page 512) she comments, "The perseverative function . . . was consistently different in the two children on the January and June examinations.² *T* remained at each of the eight situations longer than *C*, and her total time spent on the toys was twice as much. This confirmed a general impression that *T*'s attention to a task was apt to be longer than her sister's.

"On the October examination after the twins had had some kindergarten training, *T* spent less time than on previous examinations, but *C* increased her time greatly and in certain situations spent longer than *T*."

b. Summary. Although training greatly increased the time *T*

²The examination given six months after training, and that given one year after cessation of training.

spent attending to any toy with which she might be presented, it did not change her characteristic attention pattern; it merely narrowed her field of interest. Within this narrower range of interest she still responded more immediately, more discretely, and changed her particular focus of attention more frequently than her co-twin *C*.

The kindergarten experience to which both twins were exposed gave *C* training similar to that which we had given earlier to *T*. This increased *C*'s attention span for one toy so that she even surpassed *T*'s attention span and made the twins comparable to their relative position in attention span at the beginning of the experiment.

2. Play in Terms of Toys and Toy Contacts

The protocols of play behavior prior and subsequent to play training have been analyzed to determine the number of different toys contacted and the number of play contacts. These two data are not necessarily related, since a child might play with only two toys, yet alternate his activity with them so that the total number of separate contacts would be large.

Table 7 gives the statistics. Prior to training *T* contacted a

TABLE 7
ANALYSIS OF TOY CONTACTS PRIOR TO, DURING, AND AFTER TRAINING

Age	Duration of observation	Number different toys		Number play contacts	
		<i>T</i>	<i>C</i>	<i>T</i>	<i>C</i>
<i>Prior to training</i>					
89 weeks	10'	8	6	27	29
2 years	34'	17	13	25	26
3 years' play together	25'	14	14	32	32
		19	12	39	31
3 yrs. 2 mos.	25'	11	7	32	36
<i>During training</i>					
3 yrs. 7 mos.	45'	16	19	49	91
3 yrs. 9 mos	45'	14	11	38	39
3 yrs. 9 mos.	45'	Three toys only		5	13
<i>After training</i>					
3 yrs. 11 mos.	45'	6	9	7	23
3 yrs. 11 mos	45'	6	9	11	15
3 yrs. 11 mos.	45'	4	6	11	11
3 yrs. 11 mos.	45'	9	11	21	31
3 yrs. unfamiliar room		5	8	8	23
4 yrs. 9 mos.					
1 yr. after training		14	16	32	36

greater variety of toys than *C*, except on one occasion. However, there was no consistent or appreciable difference between the twins in the number of separate contacts with the toys. This reflected *T*'s wider and more exclusive interest, and *C*'s tendency to a more restricted range of interest with recurrence to her original interest object.

After training, however, *T* confined her activity to fewer toys, while *C* continued to present much the same behavior as that shown prior to the experiment. To this extent *T*'s behavior had been channelized. Channelization of activity was also reflected in the fact that after training *T* had fewer separated toy contacts than formerly, while *C*'s behavior remained unmodified (see Table 7). However, the effect of training had disappeared after the passage of one year.

In summary, there was definite evidence that *T*'s behavior had been modified. Instead of scattering her energy in varied exploration, she had been "taught" to explore more continuously each play toy.

3. *Timed Sequence of Play*

The charts (Figure 1) are to be read from left to right. They indicate the sequence and duration of *T*'s and *C*'s play with the various toys in the playroom. There was only one timed observation prior to training but the differences between *T* and *C* on this occasion were highly characteristic of the differences observed from early infancy; it was not merely an isolated brief observation as a first inspection of the chart might suggest.

The first bar chart shows that prior to training *T*'s and *C*'s play patterns were highly similar except that *T* changed her play toy slightly sooner and was more active; she chose carriage play, rather than sedentary coffee pot play. Not shown on the chart is the fact that *T* asked more frequently for help, was more active in her excursions about the room, and was more exploratory than *C* in getting doll clothes from the chest. *T* spent less time than *C* in actual play: *T*, 7 minutes 25 seconds; *C*, 8 minutes 35 seconds.

The next three bar charts, 2, 3, and 4 of play after training give evidence of the channelization of *T*'s behavior, as opposed to

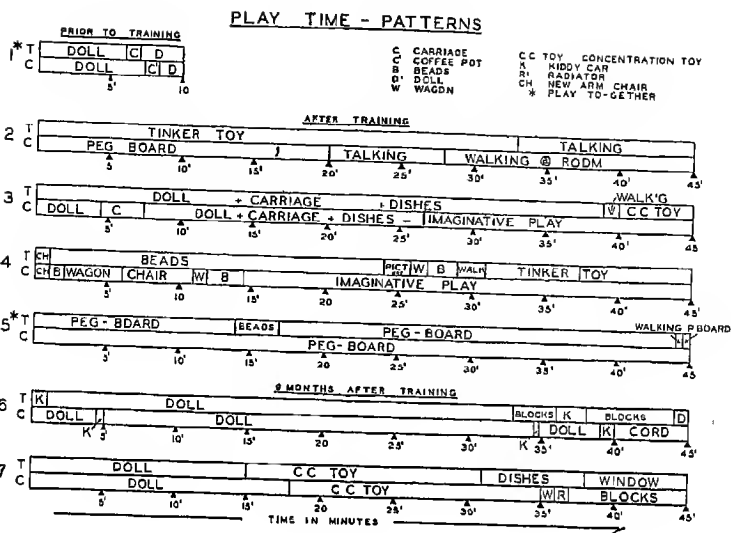


FIGURE 1

C's occupation with imaginary conversational play. With respect to No. 2, *T*'s activity was varied in that she built and rebuilt different constructions with the toy but she occupied herself with that one toy. While *C*, after building 20 minutes with the toy, talked to herself, walked about the room restlessly, and then stood fingering the radiator, apparently waiting for the time to pass.

During the play period represented by No. 3, *T* at first played as she had been instructed with the housekeeping toys. After 39 minutes of play she rolled on the floor, talked about various things, and then started play with the concentration toy. The rolling about on the floor had the appearance of expressing release from an arduous task. *C*, on the other hand, continued doll play throughout the session except for one diversion with the doll carriage. Her play was of an imaginary character imitating the occurrences which she had probably experienced at home. As usual, *C* showed no clear cut demarcation between one play activity and another.

The play represented by No. 4 took place in an unfamiliar room. Both *T* and *C* first explored the new chair, then *T* worked hard

and long at stringing beads and later at tower construction; while *C* after repeatedly exploring the roller of beads, and the wagon, settled down to imaginative play. *T* had been taught ways of playing with the toys while *C* had not. *C* therefore reverted to behavior within her experience.

The effects of *T*'s training are thus seen to be related to specific play experience. *T* was trained in certain routine play activities, while *C* left to her own devices, became accustomed to occupying herself imaginatively.

Bar No. 6 pictures the play time-sequences when the twins were observed playing in the same room. In each other's presence, their original play characteristics were displayed. *T* was the first to turn her attention from the peg board and even tried to induce *C* to cease playing but *C* was not so influenced. She continued peg board play until the 45-minute period was over. *T*, however, directed her attention to the beads for three minutes before returning to the pegs. Before the 45-minute period was over, *T* left the toys for three minutes and then returned to her play.

Nine months after the training had ended, *T* had reverted to her former play characteristics even in solitary play, except that she persisted long and was skillful in dressing the doll. *C*'s doll play was more imaginative than *T*'s, and *C*'s periods of diversion from doll play were shorter than *T*'s. *T*'s imaginative play related to the kiddy car which she called a "horse" (see bar No. 6). Again bar No. 7, also representing play behavior nine months after the training ceased, shows *T* continuing her original play characteristics. *T* played more intensely, directed her attention sooner and changed her activity more completely when she did shift her attention to another toy, while *C* tended to cling to one toy and divert her attention marginally.

4. Summary

Comparison of the play records in terms of timed activity sequences before and after training confirmed the effectiveness of the training with respect to channelizing *T*'s behavior. She played long and concentratedly with the toy of her choice. However, closer scrutiny of the records showed that the change was a super-

ficial one. Within the restricted area of one toy play she diverted her attention and varied her activity as she had done before training. Furthermore, even the restricted play characteristics did not maintain when the twins played in the same room, each with her own toys, and nine months after training was discontinued were no longer evident even in solitary play.

F. SUMMARY AND CONCLUSIONS

By the method of co-twin control, *T*, one of a pair of identical twins, 3½ years old, was trained to channelize her activity, to play continuously with the toy of her choice. She was given 25 training periods, usually two a week, over a period of four months. Each period lasted for 45 minutes. Her co-twin was simultaneously exposed to duplicate toys in a duplicate room, but her play was undirected. Scores on the *Cushing Test of Perseverative Tendency*, the number of toys played with, and the timed records of free play, before and after training, indicate that in comparison with her co-twin, *T*'s behavior had been modified: she learned to play with the toys in a specific way; and her area of attention showed restriction. But within the restricted area her characteristics of attention relative to those of her twin remained as before: she continued to play with the toys more discretely, to shift her activity sooner, and to resort to physical activity to a greater extent than her co-twin. The restriction in play area shown by confining her play for a relatively long period to one toy was reacted to by impulsive immature physical activity such as rolling on the floor. The effects of training did not persist when the twins played together and were no longer in solitary play nine months after the training ceased. After six months of kindergarten experience, no effects of the experimental training were observable.

Co-twin, *C*, who was thrown upon her own resources during *T*'s training engaged in imaginative domestic play which was within her home experience. After the training she too discontinued this type of play when in the company of her twin and she had discarded it in solitary play nine months after training.

Incidentally the study indicated that: (a) Merely to supply toys to the preschooler is not enough. If children are to utilize the toys,

demonstration and help in their use are necessary. (b) Play can, however, be over-organized so that it is merely routine performance. (c) Undirected play activity fosters the development of phantasy and imaginary play which are important from the viewpoint of creative activity and emotional outlets.

The principal conclusions which may be drawn are that:

1. Play behavior observation may be used to study attentional characteristics.
2. The duration, variation, and tempo of the focus of attention in unrestricted activity are fundamental and individual characteristics which persist from age to age.
3. The scope of attention can be restricted by training.
4. An individual may give evidence of being disturbed by this restriction in scope if training is prolonged.
5. Even though modification in scope may be imposed by training, the individual tends to revert to previous attention patterns in a relatively novel situation.

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DEVELOPMENTAL CHANGES AS REFLECTED IN RORSCHACH TEST RESPONSES*

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Since Rorschach's original publication, a variety of papers have appeared based on individuals of various mental capacities, mental abnormalities, ages, and cultural and economic backgrounds. Out of this welter of material, it has not always been an easy task to study the manner in which the development of the individual is reflected in the results of the Rorschach test. Norms of adults have been summarized by Vernon (25) and later by Davidson and Klopfer (5). Similarly, material on children and adolescents have been presented by Hertz (7), Kerr (11), Klopfer and Margulies (15), Löpfe (16), Schneider (23), and Soares (24), to mention but a few of the investigators. Intercomparison of studies based on different age groups has yielded valuable hypotheses concerning the character of emotional and intellectual development with age, but such work is often circumscribed by the lack of equivalence of the different groups compared.

A. PROBLEM AND SUBJECTS

In the present study, it was hoped that a clear picture of the changes occurring in the development from early to late adolescence could be obtained by a study of two groups of individuals who differed only with respect to age and were equated for most of the other relevant factors that could affect their Rorschach interpretations. Ideally, it would be most desirable to study the same individuals over a long period of time such as was done by Soares (24). Under the circumstances, the present study can be considered only as one based on the comparisons of the norms of these two different groups with the limitation that such comparisons entail.

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The subjects selected were a group of 60 male Junior High School students averaging in age 13 years 9 months and 62 male College students averaging 19 years 4 months. The standard deviations of the two groups were 7 months and 16 months respectively. All the subjects were Jewish and with very few exceptions had lived in New York City all their lives. Consequently they were influenced by the same type of school system. They were equated for intelligence (in so far as intelligence tests permit such equation), academic standing, and socio-economic background. The details of the equation are presented and discussed in the following section. The interpretations of the results of this study are of course constrained by the fact that the subjects are highly selected with respect to intellectual status, but the great homogeneity of the two groups imparts a high degree of validity to the differences between these groups on the Rorschach test.

B. RESULTS

1. *Matching of Subjects*

In Table 1, the quantitative data on the matching of the Junior High School and the College group are presented. No attempt was made to obtain a person to person matching. The two groups are, however, practically identical in size and are matched very closely for the variables that were considered.

a. Background of parents and subjects.

(1). *Birthplace.* There is a striking uniformity between the two groups with respect to the place of origin of their parents. In each group more than four-fifths of the fathers and about three-quarters of the mothers were foreign born. In each group at least two-thirds of the subjects have parents both of whom are of foreign birth. The foreign countries from which the parents come are also very similar in both groups. Russia, Poland, and Austria are the birthplaces of almost all the foreign born parents. On the other hand, the subjects are predominantly first generation Americans, since 89 per cent of the older group and 98 per cent of the younger group were born in the United States. The bulk of both groups in this study (85 per cent of the older group and 95 per cent of the

TABLE 1
MATERIAL ON THE EQUATING OF THE TWO GROUPS

	College group In % for first 6 categories	Junior High School group In % for first 6 categories
1. <i>Birthplace of father</i>		
<i>a.</i> All foreign	89	81
<i>b.</i> Russia, Poland, Austria	76	76
<i>c.</i> Russia	42	52
<i>d.</i> United States	11	19
2. <i>Birthplace of mother</i>		
<i>a.</i> All foreign	79	74
<i>b.</i> Russia	42	54
<i>c.</i> Russia, Poland, Austria	71	72
<i>d.</i> United States	21	26
3. <i>Birthplace of father and mother</i>		
<i>a.</i> Both foreign	72	67
<i>b.</i> Mother—U. S. A. Father foreign	17	14
<i>c.</i> Father—U. S. A. Mother foreign	7	7
<i>d.</i> Both—U. S. A.	4	12
4. <i>Birthplace of subject</i>		
<i>a.</i> New York City	85	95
<i>b.</i> Other parts of U. S. A.	4	3
<i>c.</i> Foreign	11	2
5. <i>Languages spoken at home</i>		
<i>a.</i> Only English	26	33
<i>b.</i> Language in addition to English	74	67
6. <i>Socio-economic background (Beckman scale)</i>		
Group 1. Unskilled manual occupations	0	0
Group 2. Semi-skilled occupations	7	7
Group 3.	36	46
<i>a.</i> Skilled manual occupations	{ 32 4	{ 44 2
<i>b.</i> Skilled white collar		
Group 4.	42	41
<i>a.</i> Sub-professional occupations	{ 4 33 5	{ 2 39 0
<i>b.</i> Business occupations		
<i>c.</i> Minor supervisory occupations		
Group 5.	15	6
<i>a.</i> Professional (linguistic)	{ 7 4 4	{ 0 2 4
<i>b.</i> Professional (scientific)		
<i>c.</i> Managerial and executive		
7. <i>Intelligence test data</i>		
Mean IQ	126.8	129.2
Standard deviation	8.4	10.0
8. <i>Grades</i>		
Mean average grade	84.0	83.2
Standard deviation	4.5	4.9

younger group) were born and bred in New York City and were thus influenced by very similar school environments during the course of their development. The influence of the foreign birth of the parents in the home environment is to be seen also in the fact that in about two-thirds of the homes a language other than English is spoken. The language is generally Yiddish although in an occasional home German, Russian, or Hebrew is spoken.

(2). *Socio-Economic Status.* The subjects were classified according to the occupation of their fathers, using the Beckman scale (3) as the basis of classification. While no scale of this sort can be completely satisfactory because of the very nature of the problem, the Beckman scale has been found to be quite useful in dealing with the practical problem of job reallocation as it is organized along functional lines to a greater degree than many other scales. This type of organization makes it satisfactory for the present purpose, as we are interested in matching for the type of home background our subjects were likely to have.

As in the case of parental background, the matchings are exceedingly close. The bulk of the occupations for the two groups of subjects fall into the two middle categories (78 per cent for the older group and 87 per cent for the younger). Not only are the subjects matched very well for the occupations of their fathers but the concentration of the occupations indicates that these two groups are exceedingly homogeneous in their structure with reference to this factor.

b. Intelligence and scholastic achievement of subjects. With individuals so widely separated from each other in chronological and educational age one cannot expect that intelligence test scores and school grades would be equally meaningful in describing two groups of subjects. Specificity of interest may be an important factor in making college grades a different measure than junior-high school grades. Similarly, it is unlikely that the ordinary run of intelligence tests would be equally meaningful for the subjects of the two groups.

Since we are particularly interested in the developmental aspects of the Rorschach test in this study, our most desirable equation would be in terms of the status of our college students at the time

they were in Junior High School. This was feasible for the grades but not for the intelligence tests. The records of the college students for their first year of high school were available and their average grade was calculated for that year. The calculation was based on from 8 to 10 courses for each individual. The grades of the Junior High School students were an average of four major subjects. In other words, a year's work was used to estimate the achievement of the College students while a semester's work was used for the Junior High School group. Although the average grades thus obtained are very close to each other (84 per cent for the College group and 83.2 per cent for the Junior High School group) the equation is not necessarily as good as it seems because of the unreliability of grades. On the other hand, the use of several different courses to obtain the estimate, and the fact that the grades were obtained for the most part in the same school system, plus the fact that the averages are almost identical, would indicate that the groups are not likely to be widely separated on the achievement level.

Intelligence test results of the College group when its members were of Junior High School level were not available as in the case of grades. Accordingly, the Otis *Self-Administering Test Advanced Form*, was given to the College group. The test was given for 20 minutes instead of the usual 30. *IQ's* were estimated from Otis's tables. These measures, as can be seen from Table 1, are very similar to those obtained on the Junior High School group with the Henmon-Nelson *Test of Mental Ability*. Again, the agreement of the figures does not necessarily indicate that the groups were perfectly equated, but they are obviously both considerably above average (average *IQ's* of 127 and 129 respectively) and probably not very different from each other.

2. Rorschach Factors

The main aim in this study has been to trace the changes which occur with development as reflected in the responses of a bright group of individuals to the Rorschach *Ink-Blot Test*. In tracing these changes, we are not only concerned with trends pertaining to changes in personality as diagnosed through the Rorschach technique but we are primarily concerned with the evaluation of those

Rorschach factors which have been used as the basis of these interpretations by various investigators.

A survey of the literature, beginning with Rorschach's own work (20) to the present, would indicate that not all investigators employ the same scoring categories. This situation, as a matter of fact, sometimes makes normative comparisons somewhat difficult. The general basis of scoring is the same among all investigators. All score a response with respect to its location, the determinants which were used in arriving at the concept, and the content of the concept. However, investigators vary all the way from adhering rigidly to Rorschach's original categories plus the employment of some of his scoring suggestions given in his posthumous paper with Oberholzer (21) to the scoring of various nuances in the responses which have greatly increased the number of categories employed. In the present paper, the categories designated by Klopfer (12) have been used. Many investigators, in arriving at an interpretation of a record, evaluate responses in such a fashion as to in effect employ the various additional categories which are being used here but without quantifying them or presenting them as specially designated categories. For a normative study of this character, we feel that a more forthright system should be utilized.

In evaluating the differences between our two groups of subjects two techniques were used. In the more frequently occurring categories, differences were evaluated in terms of the standard error of the differences. In the other categories, Chi-Square evaluations were made, the distributions being broken up in terms of the presence or absence of a type of response in a subject's record. The Chi-Square technique was also used in studying the various distributions of ratios between different Rorschach categories which were obtained.

a. Manner of approach. In Table 2, the differences between the averages of the two groups for various Rorschach categories will be found. The differential utilization of the locations generally called the manner of approach is clearly shown by this table. The locations distinguished here were (*a*) the whole response (*W*), wherein the subject used the whole or nearly the whole blot for his interpretation; (*b*) large normal detail (*D*); (*c*) small normal de-

TABLE 2
EVALUATIONS OF THE DIFFERENCES IN SOME RORSCHACH FACTORS BETWEEN THE TWO GROUPS

Locations and determinants		Mean coll. group	Mean J. H. group	SD coll. group	SD J. H. group	D	D/SD _D
1.	No of R.	44.5	22.2	19.8	17.8	22.3	6.6
2.	% <i>W</i>	22.9	38.2	11.9	24.2	15.3	4.5
3.	% <i>D</i>	54.1	46.8	10.6	18.6	7.3	2.7
4.	% <i>d</i>	8.1	8.1	4.5	7.6	0	0
5.	% <i>Dd</i> + <i>S</i>	19.4	10.8	11.9	12.3	8.6	3.9
6.	No. <i>W</i>	8.6	6.4	4.5	3.0	2.2	3.1
7.	No. <i>P</i>	5.1	4.4	1.4	1.4	.7	2.6
8.	% Animal	42.3	54.2	14.3	14.5	11.9	4.6
<i>Determinants</i>							
1.	Human movement (<i>M</i>)	4.2	1.9	3.7	1.6	2.3	4.5
2.	Animal movement (<i>FM</i>)	6.5	4.2	3.1	2.3	2.3	4.7
3.	Movement due to external forces (<i>m</i>)	1.9	.4	2.4	.8	1.5	4.7
4.	<i>m</i> plus additional	4.4	1.1	4.3	1.6	3.3	5.6
5.	Form % (<i>F%</i>)	44.9	48.7	10.5	19.5	3.8	1.4
6.	Shading (<i>Fc</i>)	3.0	1.4	2.4	1.9	1.6	4.2
7.	Form color (<i>FC</i>)	2.3	.6	1.6	.9	1.7	7.4
8.	Color form + color (<i>CF</i> + <i>C</i>)	2.2	.8	2.0	1.2	1.6	5.3
9.	Sum of color	3.5	1.2	2.5	1.4	2.3	6.2
10.	Shading as diffusion (<i>K</i>)	.7	.2				
11.	Shading as perspective (<i>FK</i>)	1.2	.4				
12.	Pure shading (<i>c</i>)	.6	.1				
13.	Achromatic color (<i>C'</i>)	1.4	.3				
14.	Shading as diffusion plus additional	1.3	.4				
15.	Shading as perspective plus additional	1.4	.5				

tail (*d*), and (*d*) rare details plus spaces. As has been mentioned above, there is not complete agreement among different investigators in either their definition of these categories or their designation of different areas of the blots into these categories. Thus, some investigators do not score a response as *W* unless the entire blot has been used and many investigators do not use the small normal details, generally distributing some with the large details and some with the rare details. The areas scored as *D* and *d* in this study are those so designated by Klopfer and his collaborators (14) after the examination of the areas treated by Beck (2) and Hertz (8), and the merging of their own data with that of the previous investi-

gators. For the purposes of this study slight differences between our scoring and that of other investigators are not important as the scoring is the same for the two groups being compared. The rare details are all the remaining areas and have been merged with the space responses in our evaluation of the approach of the groups.¹

In comparing the two groups of subjects with one another, we find that the Junior High School group produces a greater percentage of whole responses and a lesser percentage in the *D* and *Dd* areas. For the least reliable of these differences (between the average per cent *D*) the probability of a true difference existing is over 99 in 100. There is no difference between the relative frequency of incidence of the small normal details.

These differences are extremely interesting both from the point of view of Rorschach theory and other considerations. The interpretative significance of the differential use of these areas are discussed in many sources such as Rorschach (20), Vernon (25), Klopfer (12), and Beck (2). In the main most writers repeat with some elaborations Rorschach's original assertions which were themselves based partly on logical analysis and partly on empirical investigations. A high number of whole responses of a certain quality has been considered to be characteristic of those with theoretical interests, interest in the abstract forms of thinking and the higher forms of mental activity, e.g., logical or constructive capacities, philosophical or religious speculation, esthetic or ethical understanding; though an absence of such whole responses does not necessarily indicate that the subject does not possess such capacities. The large details have been used to indicate the individual's adjustment to the obvious facts of every day living, the development of his common or practical sense. Emphasis of the rare areas has been variously interpreted. For individual analysis the various kinds of rare details employed by different subjects should be examined carefully. Rare details may be overemphasized by those to whom high form accuracy is compulsively overvaluated (the pedantic kind of

¹The spaces have been used infrequently by our groups averaging 1.0 responses for the older group and .5 by the younger group. For individual treatment it would undoubtedly be desirable to keep responses to the white spaces as a separate category.

individual). An overemphasis on rare details may be indicative of strong obsessional traits. They may also be overemphasized by the schizophrenic individual in which case the qualitative differences assume a different character. Or they may indicate discriminative sensibilities and a quick, elastic mind.

The variations in emphasis between our two groups with respect to *D* and the rare areas seem to be simple enough to explain. It is to be noted, that *D*% of the older group is on the upper fringe of the average normal percentage given by normal adults in this category according to Klopfer (12). The younger is below it, although not to much below it. We might consider these results as portraying the greater cognizance of the older group of the ordinary aspects of reality although the younger group has developed almost to an adult level with respect to this factor.

The greater emphasis on rare details of the older group [their average per cent of 19.4 being much higher than the norm presented by Rorschach (20) of 8 or 9 per cent] should be seen in terms of the specific factors influencing their development. The older group consists of college students, we might add, successful college students. For a much longer period than the younger group they have been subjected to a regime stressing accuracy and the knowledge of a large number of small facts. That this condition would not produce a modal tendency towards some overemphasis of the rare details would indeed be surprising. It would be extremely interesting to compare these groups with others of a differential educational history. It is very likely that such comparisons would shed light on the possible interpretations of other obtainable distributions of the Rorschach locations.

The higher *W*% of the younger group cannot be explained as simply as the distributions of the foregoing locations have been. It would be difficult to maintain the thesis that the younger group has stronger theoretical interests than the older group. What is involved, we believe, is combinations of other influences. Both groups undoubtedly stress intellectual achievements. The strong creative urge in the younger group is not tempered as much by demands of reality and the differentiation of interests as is the case of the older group. To a greater degree than in the older group

is the sense of achievement more nearly satisfied because of the lessened demand of other needs, by the production of whole responses. Examination of the qualitative differences in the whole responses produced might give us further clues as to the interpretative significance of the differences found in the two groups. If our results are properly interpreted as showing a lesser degree of differentiation of interests and perception in our younger group, then these results are consistent with the evaluation of the development of abilities in other areas. The work of Asch (1) and of Garrett, Bryan, and Perl (6) on the differentiation of abilities with increasing age are particularly appropriate for comparative purposes.

b. Determinants. Since the pioneer work of Rorschach, various investigators have added to his list of determinants but the fundamental areas still remain the same. The human movement responses (M), the three varieties of color responses (C , CF , FC) and the pure form responses (F) are still the main determinant areas utilized for interpretation. In Rorschach's posthumous paper with Oberholzer (21) there is a recognition of the value of distinguishing tendencies towards movement as well as the inclusion of shading responses. In the present paper, in addition to the traditional Rorschach determinants, cognizance has been taken of the values of movement tendencies by including animal movement (FM) and movement produced by external forces (m). Responses determined by both form and shading (Fc), shading used as perspective (FK), and shading used for the perception of diffusion (K) have also been differentiated. The use of achromatic color values (C') has also been tabulated although in our samples, it is not of very frequent occurrence.

In terms of general growth and development, the absolute amount of the main determinants are of value since many interpretations are based on absolute quantities.² Relationships between the main determinants within the individual will be discussed in a later section. As can be seen in Table 2, the differences between all the determinants which have been evaluated are significant with the exception

²Rorschach's (20) classification of individuals into coactive, coartative, introverted, extratensive, and ambi-equal types was based not only on the interrelationship between the frequency of M and color responses but also upon their absolute levels.

of the form per cent which while greater in the younger group is not reliably greater. With responses such as the human movement presumably mirroring the wealth (or poverty) of the inner life of the subject and the color responses giving us information with reference to the organization of his responses to emotional stimuli (Rorschach, 20; Klopfer, 13), the differences among the distributions of the determinants in the two groups cannot be attributed merely to the wide difference in response level which exists between them. Unless our younger subjects were on the average compulsive to an unusual degree, we could not expect them to make response after response nor would we expect under such circumstances that there would be any substantial changes in any but the form percentage level. We must expect that, on the whole, the lower response level of the younger group has been produced by the inability to utilize the various determinants to the degree that the older group has. This is not surprising. We would expect a greater absolute level of inner ideas on the part of the older group, and more varied and more highly developed modes of coping with external stimulation.

It is interesting to note that differences between the two groups in the color area have higher critical ratios than in the movement area. The significance of this will appear in the section on intrapersonal ratios. The patterns of movement responses are different in some interesting details. While the order of responses is the same in each group, being highest for the animal movement and lowest for movement produced by external forces, the relationship between these determinants in the pattern of each group is not the same. The *m* responses are practically non-existent in the younger group although the older group averages nearly two per person. In the younger group there are more than twice as many animal movement responses as compared to human movement responses, while in the older group the ratio is about one and one-half to one.

These differences probably mirror genuine developmental changes. The greater relative importance of the *m* response in the movement constellation of the older group is consistent with interpretations that have been made when this determinant is present. Klopfer and his collaborators (13) have interpreted such tendencies to movement

as indicating conflict and repression. Strong inner conflicts leading often to repression can of course be found in the younger group, but we would expect them to be more frequent and deeper in the older subjects. The greater importance of animal movement in comparison with human movement in the younger group would be consistent with the interpretation of overproduction in this determinant area being indicative of immaturity and perhaps infantilism (13). In individual cases such interpretations should be made with care and possibly is not justifiable when the human movement level is high.

The two groups are widely separated with reference to their use of color as a determinant in all aspects except pure color which occurs very infrequently in both groups. In 33 per cent of the younger group, no color is used at all as compared to a similar failure on the part of only eight per cent of the older group. This may mirror an inability on the part of many members of the younger group to cope with emotional stimulation at all and to meet their problems by avoidance or withdrawal into themselves. The employment of the form color response in the younger group is extremely infrequent. This response has been interpreted as indicating the individual's rapport with the external world, and has been used by Rorschach (20) also as an index of the individual's understanding of other people. We would expect, therefore, that the occurrence of this type of response would vary with the maturity of the group studied. The comparable low level of the color form plus pure color response in the younger group is somewhat surprising to us. These responses, often indicators of impulsivity, do not appear much more frequently than the form color responses. Comparisons of young adolescents from different socio-economic levels than ours, or of different intelligence status, would be exceedingly appropriate here.

Many of the determinants do not appear with any great frequency either in the group as a whole or in individual records. For such determinants, the differences between the groups were evaluated in terms of whether or not the determinant was present in a given record by using the chi-square test. The results are presented in Table 3, the frequencies in each category being presented in per-

TABLE 3
EVALUATION OF DIFFERENCES AMONG DETERMINANTS BY CHI-SQUARE TEST

Determinant	College group		Junior High School group		Chi-Square	P
	% having no resp. in given category	% having 1 or more in given category	% having no resp. in given category	% having 1 or more in given category		
<i>m</i>	29	71	72	28	22.2	<.01
<i>m</i> and additional	15	85	50	47	20.6	<.01
<i>K</i>	58	42	38	12	14.2	<.01
<i>K</i> and additional	42	58	67	33	7.2	<.01
<i>FK</i>	53	47	75	25	6.3	.01
<i>FK</i> and additional	52	48	67	33	2.9	.09
<i>FG</i>	5	95	35	65	17.6	<.01
<i>c</i>	58	42	93	7	20.8	<.01
<i>C'</i>	32	68	73	27	20.6	<.01

centages. The evaluations were of course made in terms of the absolute number of individuals appearing in each category. Movement produced by external forces was included in this table although differences in this area had been previously evaluated in terms of the critical ratio.

The evaluation of "additional determinants" was also made use of in this section. A given concept is sometimes developed through the use of more than one determinant. Usually one of them is obviously more significant than the other and they may be scored as main and additional determinants respectively. Since m and K appear often as additional determinants the chi-square test was applied not only to the main responses of these categories but also to the main plus the additional. In Table 3 we find that in all but one instance (FK plus additional) the probability of the contrasted distributions being equivalent is only 1 in 100 or less than 1 in 100. In all cases, the older group has a greater frequency of response. The increase in the Fc and c responses may mirror an increasing awareness and understanding of others which we would also expect to increase with growth and maturity.

3. Intra-Personal Ratios

a. *Introversion-extroversion (extratensiveness)*. A number of ratios based on comparison of different aspects of Rorschach test data have been devised by various investigators employing Rorschach test. The most fundamental one, devised by Rorschach, is the ratio between the total number of human movement responses to the sum of color, a ratio which presumably is a sign of the "*Erlebnis-typus*" of an individual.³

Rorschach divided individuals into five groups on the basis of this ratio as was described elsewhere in this paper. For our purposes, a threefold classification was used, that of introvertive, ambivertive, and extrovertive (extratensive). These concepts as employed by Rorschach were derived from Jung's typology. The introvertive individual is one whose interests are directed mainly inwardly, the extrovertive towards the object, and the ambivert's interest being

³The sum of color is obtained by weighting from color responses as .5, color form responses as 1, and pure color as 1.5.

TABLE 4
EVALUATION OF THE DISTRIBUTION OF RATIOS

	College group			J. H. S. group			Chi-Square	P
	% Ext.	% Ambi.	% Int.	% Ext.	% Ambi.	% Int.		
1. Introversion-extroversion ratios								
$M/\text{sum of } C$	33	37	30	36	17	47	6.6	.04
$FM+m/Fc+c+C'$	18	34	48	5	44	51	5.0	.08
Per cent re-sponses to last 3 cards	50	37	13	38	40	22	2.4	.30
2. Ratios of whole figures to details	Per cent			Per cent				
Ratios of 0-2	48			40			.9	.39
Ratios greater than 2	52			60				
3. Ratios of whole card used as location to no. of human movement responses (W/M)								
Ratios of 0-2	48			37			6.1	.014
Ratios greater than 2	52			63				
Ratios 0-1	15			5				
Ratios 1-3	47			38			5.4	.07
Ratios greater than 3	39			57				
Ratios 0-1	15			5				
Ratios 1-2	34			22				
Ratios 2-3	13			17			6.8	.08
Ratios greater than 3	39			57				

directed equally inwardly and outwardly. Ratios greater than 2 were classified as introverted, ratios between 1 and 2 inclusive as ambivertive, and those that were less than 1 as extravertive.⁴

⁴The concept of the coactive types, that is of individuals who had no

While the M to the sum of C is always considered the basic ratio two other subsidiary measures were also considered. They were the ratio of the sum of animal movement and movement due to external forces ($FM + m$) to the use of achromatic areas as determinants ($Fc + c + C'$), and the per cent of the total responses that were given to the last three cards, all of which are colored. The lines of demarcation were the same for the second ratio as for the first. For the responses to the last three cards, less than 30 per cent was classified as introvertive, between 30 and 40 per cent inclusive as ambivertive, and more than 40 per cent as extrovertive. It is to be borne in mind however, that the demarcations upon which the last two measures are based are arbitrary, and it is possible that they may be altered on the basis of future empirical investigations.

In comparing the two groups with respect to the basic ratio, we find that the chances of the distributions being the same are 4 in 100. The distributions of the younger group is more heavily weighted in the introvertive direction. The differences in the second ratio are less significant ($P = .08$), and although the groups do not differ significantly with respect to the distribution of the per cent of the last three cards ($P = .30$) the tenor of these three measures are in the same direction. The data of the younger group is weighted away from the extrovertive side. With reference to the basic ratio, 47 per cent of the younger group have a ratio greater than two, while 30 per cent of the older group fall into this category. The high incidence of "introvertive" ratios for both groups in the second measure may be a function of the manner in which the ratio is obtained as well as of arbitrary demarcation points. The closer resemblance of the two groups with reference to their performance on the last three cards would suggest that this measurement cannot be considered as one that is coördinate with the first and basic ratio.

b. Ratio of whole figures to parts of figures. In responses where the content consists of a human being or an animal, the subject may

human movement and no color responses was not employed here. There were two such individuals in the older group and five in the younger. These subjects were not used in the above distributions.

give a complete individual or a human or animal detail. The ratio between the frequency of whole figures and parts of figures used by each subject was obtained. An overweighting of detail use is often considered as indicative of argumentativeness sometimes said to be characteristic of early adolescence. The ratios were divided simply into those greater than two and those less than two. The two groups are not differentiated on this basis ($P = .39$). If anything, the younger group makes less frequent use of details than the older group.

c. *Ratio of responses to the whole card to the number of human movement responses (W/M)*. The W to M ratio has been taken as an index of how well or productively an individual is using his ability. Both measures W and M have been taken as indices of intelligence. According to Rorschach (20) the optimum ratio between W and M is 2 to 1. Ratios smaller than that have been interpreted as indicating that one is not producing up to his capacity. Ratios greater than two may indicate a great urge towards achievement which goes beyond the individual's capacities. Before any blanket decision is made for any individual it certainly would be necessary to examine the quality of the whole and movement responses. Interpretations of ratios greater than two would certainly have to be tempered by whether there was an abundance of poor or obvious whole responses or whether the quality was generally high.

The bare statistics of our own results are, however, extremely interesting. When the distribution of ratios is broken up into those below two and those above two, the two groups are significantly separated with the greater ratios being found more frequently in the younger group. Other fractionizations, while changing the measure of significance slightly, emphasize still more that the younger group has larger ratios. Thus 57 per cent of this group have a ratio of three or greater as compared with 39 per cent of the older group.

If both W and M are to be taken as measures of intelligence, it is obvious that they do not exhibit the same growth curve. The number of W 's ceases to differentiate earlier than do the number of M 's. The latter then may also be considered as being associated with maturity. The whole responses may represent a necessary frame-work in which the maturing intellect can work.

4. *Popular Responses*

Practically all investigators take note of so-called popular responses although there is no exact agreement as to the different ones. An excellent summary of the work that has been done on popular responses is given by Hertz (9). A popular response is one which occurs very frequently, but investigators have not agreed on a critical frequency. With frequency as the sole determiner, it is quite obvious that the character of the group in question is extremely important in the determination of what constitutes a popular response. Vernon (25) found in a group of well educated adults that a given response which had been listed by Rorschach as being original (i.e., occurring once in a 100 or more records) actually occurred in 10 per cent of his records. Rorschach took as his criterion the occurrence of a response in one-third or more of his sample. He felt that noting the frequency of popular responses in a record was a valuable procedure as it gave some measure of an individual's capacity to think like and to see things as others saw them. Too few populars might indicate a lack of rapport between an individual and his group. Too many, might indicate too great compliance with social norms or too great a desire to please. It would seem quite logical then, to use the per cent of popular responses as an intra-personal measure. We feel however that with a large number of responses the per cent popular would probably not be a very valid measure.

Hertz (9) after surveying the field, concluded that a frequency of 1 in 6 was adequate to determine the popularity of a response. On this basis she listed 34 popular responses for her adolescent group. In comparing her work with five other investigators she found 23 forms which had been listed as popular by three or more investigators. This would seem to make a percentage measure feasible if it were not for the fact that a great many of the 23 populars for which there was agreement were really variations of the same concept. While a subject occasionally gives these variations in the same record, this behavior is rather rare. In actual practice, if a subject perceives a given popular response he generally does not give the correlated variation unless he is at a loss and feels a compulsion to go on. This drastically reduces the effective

field of choice for the subject and with an increasing number of total responses the per cent popular becomes a more and more dubious measure.

In this study, the popular responses as indicated by Klopfer (12) were used. The number of populars is thus limited to 10, although variations of the same concept are given full credit in individual records. These populars actually include the bulk listed by Hertz as having designated by at least three or more investigators as popular responses. Our younger group averaged 4.4 popular responses, the older group 5.1. But because of the large difference in the number of responses the averages of per cent popular differ markedly from each other. The average for the younger group was 28.5 per cent and for the older 14.6 per cent. The former figure corresponds favorably with Hertz's (9) findings on young adolescents of ages similar to ours, but few investigators agree with our findings for the older group. Very few groups reported in the literature, however, are comparable to ours in educational and intellectual status and most of them give a fewer number of total responses.⁵ Hertz (9) found that the popular per cent correlated .54 with the Woodworth-Mathews questionnaire, but this was in adolescents varying in age from 12 years 6 months to 16 years 5 months. We do not know whether a similar relation would hold in older groups. Perhaps the absolute number of populars would be more useful or perhaps on the higher age and intellect level the popular response would only rarely be a discriminating factor.

In Table 5, the frequency for each response we scored as popular is presented. For only one of them, the caterpillars or worms in Card X is the critical ratio greater than three. For the rest, while the older group gives these responses more frequently, the differences are not statistically significant. The frequency with which each popular appears in each of the two groups has virtually the same order. A rank difference correlation between these frequencies is

⁵The point is well illustrated in Vernon's (25) own data which is often quoted to fix the per cent popular of superior adults at about 25. For his Yale group, which gave an average of 21.5 responses the per cent popular was 31. His English group which averaged 39 responses had a 19 per cent popular responses. Note that our group, with a higher number of responses, had a popular per cent of 14.5.

TABLE 5
EVALUATION OF THE DIFFERENCES BETWEEN THE FREQUENCIES OF THE
POPULAR RESPONSES

Location of popular		% coll. group	% J.H.S. group	D	D/SD_D
1.	Card I "bat," "butterfly"	53	56	3	.3
2.	Card II "two animals"	45	42	3	.3
3.	Card III a. "two men"	58	45	13	1.4
4.	b. "butterfly" "bow-tie" "hair-ribbon"	26	20	6	.8
5.	Card V "bat," "butterfly"	85	73	12	1.6
6.	Card VI "fur rug"	47	33	14	1.6
7.	Card VIII "two animals"	98	90	8	1.8
8.	Card X a. "crabs," "spider"	40	32	8	.9
9.	b. "rabbit's head"	23	12	11	1.6
10.	c. "green worms," "caterpillars"	39	5	34	5.0

.94. This would indicate that the commonality of thought which the perception of the above populars would mirror has already developed quite strongly in our younger group. It is quite possible that such agreement would not have been obtained had the younger group been less mature intellectually.

As far as the above populars are concerned, if one accepts Hertz's criterion of a frequency of one in six, only the rabbit's head, and the caterpillars in Card X would not be popular, and this condition would hold only for the younger group. The character of the emphasis on the different populars corroborates some of the points made previously. The difference between the people in Card III, generally a movement response, is small but not significant. Thus, the most obvious human movement responses to be found in the cards is responded to almost as well by the younger as by the older group. The differential interest in movement as contrasted to color is well illustrated in comparing the two groups for the caterpillar response which is generally seen as a green caterpillar. Only 5 per cent of the younger group as compared to 39 per cent of the older group gave this response. The rabbit's head, which is virtually surrounded by the caterpillars, also is seen less frequently, being perceived by only 12 per cent of the younger group.

5. "*Neurotic Signs*"

A number of studies have appeared in the past few years wherein attempts have been made to utilize some of the Rorschach data as signs diagnostic of various mental conditions. Thus Piotrowski (19) has evolved a series of 10 signs which have been helpful in diagnosing the presence of organic brain lesions, and Kelley and Klopfer (10) have surveyed the literature indicating the possibilities of a sign approach to the diagnosis of schizophrenia. Piotrowski (18), investigating the use of the Rorschach method in predicting which kind of schizophrenic individuals would recover after Insulin Shock Treatment, found that the presence of certain signs, for example human movement and color responses, made reliable predictions possible. It is not our intention, here, to discuss the various problems which the use of signs gives rise to. It should be quite obvious that for any individual diagnosis, signs should be used with great caution and the validity of any alleged signs be studied with exhaustive thoroughness.

Recently, Miale and Harrower-Erickson (17) have presented a tentative list of nine neurotic signs, that is, various Rorschach indices which on the basis of their work differentiated a group diagnosed as neurotic from a normal control group. The neurotic group averaged 6.5 signs while the normal group averaged 1.5. The work of Ross (22) has indicated that factors of intelligence and educational status change the situation greatly. His results cast some doubt on the validity of these signs as being specific only to individuals diagnosed as neurotic. In his study, psychoneurotics averaged 5.7 signs, soldiers from a low socio-economic background averaged 4.9, while superior normals averaged 1.9. The discrepancy between the scores of superior normals and the average individuals suggested that intellectual differences or differences in ways of living that made for variations in the richness and fullness of life could also account for those signs, at least in part. Accordingly, it was felt that a comparison between our less mature and more mature subjects would be of some value.

The signs listed by Miale and Harrower-Erickson and which were studied here were:

1. Less than 25 responses (*R*).
2. Zero or one human movement response (*M*).
3. Fewer human movement responses than animal movement ($M < FM$).
4. Color shock.
5. Shading shock.
6. Refusal of one or more cards.
7. Form percentage 50 or over (*F%*).
8. Animal percentage 50 or over (*A%*).
9. Zero or one form color response (*FC*).

Color shock was determined through the application of the criteria given by Brosin and Fromm (4). These criteria were applied by analogy to determine shading shock. Following Miale and Harrower-Erickson, the presence of at least one of the 10 criteria listed by Brosin and Fromm was deemed sufficient to determine the presence of color shock. It is for this reason that the per cent of color shock is so high, and it is quite likely that color shock in neurotics is qualitatively different from a good deal of the color shock that our subjects evinced. Our percentage would undoubtedly have been lower had only severe manifestations of color shock been listed.

In Table 6, the per cent of subjects in each group having each sign and the evaluation of the differences in these percentages is presented. The younger group is more frequently represented in all but one sign, averaging 5.1 signs to 3.1 for the older group. This difference is reliably greater than zero.

TABLE 6
EVALUATIONS OF THE DIFFERENCES BETWEEN THE RELATIVE FREQUENCIES OF EACH "NEUROTIC SIGN"

Signs	% coll.	% J. H. S.	<i>D</i>	<i>D/SD_D</i>
1. Responses less than 25 (<i>R</i>)	15	75	60	8.3
2. Zero or 1 human movement (<i>M</i>)	18	47	29	3.6
3. Human movement less than animal movement ($M < FM$)	73	60	13	1.5
4. Color shock	56	58	2	.2
5. Shading shock	32	43	11	1.3
6. Refusal of one or more cards	8	23	15	2.3
7. Form percentage 50 or more (<i>F%</i>)	34	53	19	2.2
8. Animal percentage 50 or more (<i>A%</i>)	27	67	40	4.8
9. Zero or one form color response (<i>FC</i>)	31	85	54	7.2

The least significant differences between the two groups are to be found between $M < FM$, color shock and shading shock. For the latter two, the cause, as has been suggested, may be the multiplicity of criteria. Development of scales to gauge the extent of color shock and shading shock would probably be useful in this area. In connection with the sign $M < FM$, it is useful to note that this is the only sign which appears more frequently for the older group than for the younger and that as many as 73 per cent of the older group have this sign. This high percentage would indicate that the sign as it currently stands is too general in nature. A limitation on the definition of this sign might turn out to be more useful. Empirical investigation may indicate that this sign would be useful only when the number of M was small or when the discrepancy between M and FM was very large.

The remaining signs mirror various developmental facts that have been brought out in earlier discussions. The lower range of interests and ideas in the younger subjects is probably the main cause for differences between the groups with reference to R and animal per cent. The fact that almost one-quarter of the younger group of subjects have at least one refusal of a card could be due to the inability to make whole responses to some of the cards which are complexly structured, plus the usual shading and color shock. The younger group, it will be remembered, made less frequent use of detail responses. Furthermore, inability to make a whole response may be followed by the rejection of the card rather than by the selection of a detail area. The great incidence of " FC " as a sign for the younger group (85 per cent have one or no form color response) again emphasizes the extreme difficulty that the younger group have in this area. This defection on the color side of course enhances the constricted picture shown by the high incidence of form percentages of 50 or over to be found in the younger group.

C. CONCLUSIONS AND SUMMARY

1. *General Implications of the Results*

Perhaps the most outstanding feature of these results is the greater differentiation and the character of the differentiation of the older as compared to the younger group of subjects. The members

of the older group do not only have a greater number of responses but pattern them in a different manner. The greater emphasis on the whole response on the part of the younger subjects and the consequent lessened emphasis on the detail responses is very consistent with an organismic hypothesis of development.

The greater number of responses given by the older group are not used simply to multiply the form, movement, and color responses found in the younger group. Rather shading responses, some of them indicative of anxiety, and movement responses due to external forces, make their appearance. Nuances are being added to the total individual pattern.

The most general intra-personal finding is that the emphasis on human movement as contrasted to color is greater in the younger group than in the older, yielding a more predominately introverted picture in that group as compared with the older group. We might possibly infer here, that the emotional and social development of our younger subjects is lagging behind their intellectual development. This raises a question which cannot be answered in terms of our data. We would like to know the extent to which school pressures and/or the lack of a variety of satisfactory outlets engendered by the socio-economic conditions of our subjects is a determiner of their low color level. Comparisons of our groups with groups of equivalent intelligence but with greater opportunities for emotional outlets would be extremely valuable.

Comparison with other studies indicates the value of long range studies when the Rorschach is being employed. Löpfé (16), using a narrow age range of from 10-13, finds very little change with age. Kerr (11), studying children who varied in age from 7 to 16, found that the sum of color was reduced with increased age. If our results can be compared with Kerr's it is quite obvious that the reaction to color is a function which does not change continuously in the same direction with increasing age since our older subjects are far more responsive to color than our younger subjects.

2. Summary

1. The Rorschach *Ink-Blot Test* was administered to 60 boys attending Junior High School and averaging 13 years 9 months

in age, and 62 male college students averaging 19 years 4 months in age.

2. The two groups of subjects were equated for intelligence, academic status, and socio-economic status. They were predominantly American born, while their parents were predominantly foreign born. The great majority of the subjects had lived in New York City from the time of their birth.

3. A number of differences between the two groups with respect to their responses to the Rorschach test was found.

(a). The older group gave a significantly greater number of responses than the younger group.

(b). The younger group emphasized whole responses more than the older group did, the older group making much more frequent use of rare details.

(c). Both human movement and color responses were produced in greater abundance by the older group than by the younger one. In comparing human movement with color, however, it was found that the excess of movement over color was greater in the younger group than in the older, pointing to a more extensive introvertive picture in the younger group.

(d). In general the older group's greater number of responses were partially employed in the direction of giving more highly differentiated Rorschach patterns.

(e). The distribution of the ratio of the number of whole responses to human movement responses was different in the two groups. The younger group more frequently emphasized the whole response thus obtaining on the average larger ratios than the older group. The difference between the ratios in the two groups was interpreted in terms of the different organization of creative capacities in them.

(f). The two groups differed only slightly with respect to the absolute frequency of their popular responses. They differed significantly from each other with respect to only one popular response. This response involved the use of color as a determinant.

(g). The two groups were compared with respect to the incidence of "neurotic signs." The number of signs was significantly

THE GESELL INCOMPLETE MAN TEST AS A DIFFERENTIAL INDICATOR OF AVERAGE AND SUPERIOR BEHAVIOR IN PRESCHOOL CHILDREN*

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A. THE PROBLEM AND DATA

The Incomplete Man test for children of preschool age was introduced by Gesell in 1925 (1). The results of its use with the Yale Normative Group of subjects are briefly summarized by Thompson (3).

The materials and procedure for the Incomplete Man test are simple. The child is seated at the examining table and has usually just completed drawing tests of the imitation and copy of forms. He therefore already has in his hand a pencil. A letter size sheet of green paper on which is stamped the outline of a man (in black ink) having one arm and hand, one leg and foot, one ear, and no eyes (see Figure 1) is placed before the child. Examiner asks him, "*What is this?*" He is allowed ample time to respond and if he does not do so the examiner tells him it is a man, and says, "*The person who made this man didn't draw all of him, did he? You finish him.*" If the child does not attempt to add to the drawing after he has been appropriately urged, examiner says, "*See he has only one ear. Draw his other ear.*" No other specific suggestions are given, though the child is urged to finish the man as completely as possible, and the examiner may ask repeatedly, "*What else?*"

The present study is an analysis of the behavior of 241 subjects, classified into two groups as follows: (a) 141 children of average intelligence (*IQ* range 90-110). These children were for the most part members of the Yale Normative Group (3). Their age range was from 3 to 6 years. (b) One hundred children of advanced or superior intelligence (*IQ* range 120 and up). These children were

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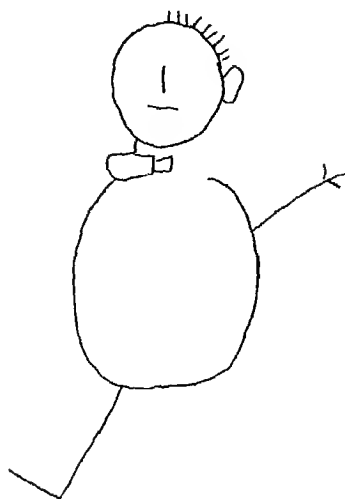


FIGURE 1
INCOMPLETE MAN TEST FORM

cases examined at the Yale Clinic of Child Development by Dr. Frances L. Ilg in connection with the diagnostic service and the work of the guidance nursery. Their age range was from $2\frac{1}{2}$ to 6 years.

All children were examined under favorable and homogeneous conditions from the standpoint of experimental control, since all the tests were presented as part of the usual developmental examination. The children were all emotionally well-oriented and this was their natural working behavior. As a comparative check and to determine more fully the degree of proficiency attained by the 6-year-old children, the test was also given to 25 adults. Their responses are included in Tables 1 and 2.

Basic data are presented in tabular form as well as in descriptive summaries. The tables give the percentages of each group who add each part, the number of parts added at each age, and the specific combinations of parts customarily added. The age trends in hair, eye, ear, arm, leg, etc., development, and descriptions of the behavior typical of each age group are also presented. An analy-

TABLE 1
PERCENTAGE OF CASES RESPONDING AS INDICATED

Age in years No. of cases	Average cases					Superior cases									
	3	4	4½	5	6	2½**	3	3½	4	4½	5	6	6	6	Adults
20	38	15	50	18	100	100	68	78	91	100	100	100	100	100	100
33	82	100	100	100	100	100	56	78	83	94	91	100	100	100	100
16	62	73	90	90	90	100	0	39	58	80	91	100	100	100	100
0	34	60	88	100	100	0	37	67	87	100	100	100	100	100	100
16	65	86	98	100	100	66	43	39	61	80	83	83	100	100	100
33	41	46	52	66	66	0	25	50	53	66	66	83	100	100	100
16	10	40	50	85	85	100	37	61	79	66	100	83	100	100	100
16	17	20	60	85	85	0	18	33	58	66	75	83	40	40	40
0	10	33	56	77	77	0	0	0	0	12	25	16	92	92	92
0	0	0	16	55	55	0	0	0	0	6	0	16	4	4	4
16	3	59	6	0	0	66	25	27	24	0	25	32	20	20	20
0	3	0	14	11	11	0	0	0	8	0	6	16	92	92	92
0	0	0	4	11	11	0	0	0	0	6	8	16	92	92	92
0	3	0	8	5	5	0	0	5	12	6	8	0	0	0	0
66	86	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0	70	93	100	100	100	100	68	100	100	100	100	100	100	100	100
0	48	86	100	100	100	66	50	83	100	100	100	100	100	100	100
0	17	60	84	94	94	33	18	61	70	80	100	83	100	100	100
0	7	46	72	90	90	33	12	39	70	80	100	83	100	100	100
0	0	26	54	77	77	0	6	22	62	66	83	83	100	100	100
0	0	13	28	66	66	0	0	5	25	40	75	66	100	100	100
9	0	6	16	38	38	0	0	0	4	20	41	66	96	96	96
0	0	0	0	0	0	0	0	0	0	6	16	32	64	64	64
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	76	100	100	100	100	60	80	100	100	100	100	100	100	100	100
75	63	40	20	5	5	100	90	38	33	33	66	0	0	0	0
1.6	3	6	6.7	8	8	3	27	4	6	7	9	9	10	10	10
1.5	1	1	.3	0	0	3	3	1	.5	.5	1	0	0	0	0

+ % given is % of those who add parts, not necessarily % of all cases.

** Only three *very* superior children add parts at this age so %'s are spuriously high.

TABLE 2
COMBINATIONS OF PARTS ADDED

Age in years % who added:	Average cases			Superior cases			Adults
	3	4	5	6	7	8	
Leg and eyes	0	24	46	52	66	66	100
Leg and arm	0	24	73	90	90	91	100
Leg and foot	16	65	86	98	100	100	100
Arm, hand, leg, foot	0	27	66	86	90	91	100
Arm, hand, leg, foot, neckline	0	7	33	48	66	66	40*
Arm, hand, leg, foot, hair	0	7	33	40	66	66	100
Arm, hand, leg, foot, ear	0	3	20	48	72	83	100
Arm, hand, leg, foot, neckline, ear	0	10	20	44	61	66	40
Arm, hand, leg, foot, eyes	0	10	20	44	61	66	40
Arm, hand, leg, foot, neckline, eyes	0	10	20	44	61	66	40
Arm, hand, leg, foot, neckline, hair	0	10	20	44	61	66	40
Arm, hand, leg, foot, eyes and ear	0	0	6	26	55	66	40
Arm, hand, leg, foot, ear and hair	0	0	20	32	61	66	40
Arm, hand, leg, foot, eyes, hair	0	0	13	22	55	66	40
Arm, hand, leg, foot, ear, eyes, hair	0	0	6	16	50	66	40
Arm, hand, leg, foot, neckline, ear, eyes, hair	16	10	13	26	61	66	40
Eyes and hair	0	0	20	36	72	66	100
Eyes and ear	0	7	6	30	61	66	100
Eyes, ear, hair	0	0	6	18	55	66	100

*Adults add tie instead of neckline.

sis of accessory marks appearing in the drawings is given. Typical responses at the several age levels are illustrated in Figure 2.

The following notes will orient the reader in interpreting these tables and descriptions.

1. In counting the number of parts added, each part is counted as one. The two eyes are counted as one part, and the same is true for all hair, for any number of fingers, and for any number of buttons.

2. Right and left refer to the child's right and left as he regards the figure of the man. Thus "foot turns left" indicates that the foot turns toward the child's left.

3. "Correct" placement, angle, and size refer to that placement, angle, and size which will give the added part the closest resemblance to the similar part already present.

4. In tables, italicized percentages indicate the behavior which prevails at any one age. Also, percentages over 50 are italicized to indicate that a behavior was characteristic of over half the group. Zero indicates that no cases exhibit a behavior in question, — indicates that no cases add the part in question so that there is no information as to behavior in question. Percentages do not always add to 100, as data are not complete in all cases.

B. AGE SUMMARIES

A brief summary of outstanding age characteristics follows. Verbalization is described in Section F, and will not be included here. The developmental emergence of all separate parts will be considered in detail in Section C; only parts added by more than 50 per cent of any age group being discussed here. Informal characterizations of the behavior of each age group are given for the superior cases only.

1. *Average Cases*

- a. *3 years.* Thirty per cent of the cases add parts, 75 per cent add accessory marks. The average number of parts is 1.6; of marks, 1.5. Parts most commonly added at this age are leg, which is in about the right place; and eyes, which are round scribbles, placed unevenly and of uneven size. Accessory marks are mostly

controlled marks on the man. One-third of the cases merely scribble in response to the situation.

b. *4 years.* Seventy-six per cent of the cases add parts, 63 per cent add marks. The average number of parts is 3; of marks, 1. Parts most commonly added at this age are leg, foot and arm, in that order. Leg is correctly placed and at the correct angle, but too long. Foot points toward the left and is too long. Arm is placed too low, points downward, and is too long. The accessory mark may be on the man, may encircle him, or may be a dissociated figure at one side.

c. *4½ years.* One hundred per cent of the cases add parts, 40 per cent add marks. The average number of parts added is 6; of marks, 1. Parts most commonly added are leg, foot, arm, hand, eyes, and umbilicus, in that order. Leg is correctly placed, straight down, of the right length. Foot is directed to the right and is too long. Arm as at 4 years is placed too low, points downward, and is too long. The usual number of fingers is three. Eyes are open circles, unevenly placed with respect to each other but of even size. An umbilicus is added, *at this age only*. The extra mark is usually somewhere on the man.

d. *5 years.* All cases add parts, only 20 per cent add accessory marks. The average number of parts added is 6.7; of marks, only .3. Parts most commonly added are: leg, foot, arm, hand, eyes, hair, ear in that order. The leg is correctly placed, at a correct angle, but too long. The foot turns right and in half the cases is of a correct length. Arm is placed correctly but points straight out and is too long. Fingers are three in number and too long. Eyes have become filled in dots, and are placed evenly but are of uneven size. Hair consists of about 9 vertical marks, too long but in the right place. Ear is placed too low or in the right place, and may in a few cases approximate the right size and shape.

e. *6 years.* All add parts, but only 5 per cent add accessory marks. The average number of parts added is 8; of marks, 0. Parts most commonly added are: leg, foot, arm, hand, eyes, hair, neckline, and ear, in that order. Leg is correctly placed and of right length, though too straight down. Foot turns right and is right length. Arm is correctly placed and points upward though

still too long. Fingers are three, and too long. Eyes are filled in dots, of even size and evenly placed. Hair consists of about 7 vertical strokes, right length and in right place. Ear is correctly placed, and in one-third of the cases of the right size and shape. Many trends reach completion at this age bringing members to right size and position.

2. *Superior Cases*

a. *2½ years.* Sixty per cent add parts, 100 per cent add accessory marks.¹ Average number of parts is 3, and of marks, 3.4. Parts most commonly added are any three of the following: eyes, umbilicus, ear, arm, leg, in that order. Eyes are open circles or circular scribbles. Ear is placed right, but tends to be a circular scribble. Arm is too high or low, slants down, and is too long. Leg may be placed correctly; points straight down or is at correct angle, and is too long. Accessory marks are for the most part controlled horizontal or vertical lines, mostly on man, though 20 per cent (most of any age) make a dissociated figure at the side. Scribbling is still strong.

Characteristic of this age are bold firm lines, added without effort at placement. Verbalization about parts is often better than actual drawing. Parts added are too long. There is considerable marking and scribbling.

b. *3 years.* Eighty per cent add parts, 90 per cent add accessory marks. Average number of parts is 2.7, and of marks, 3. Parts most commonly added are: leg, arm, and eyes, in that order. Leg is too near other, too straight down, and too long. Arm is placed too low, points too far up, and is too long. Eyes are open circles, placed unevenly with respect to each other and of uneven size. Foot, when added, points left and is too long. A few add umbilicus. Accessory marks are scribbling, horizontal or vertical marks on man, encircling man (most of any age), or separate figure at side.

Characteristic of this age are long, bold, firm lines, put on without effort at placement. Parts are added but are too long. Over-

¹Test was given only to the most superior children at this age level. Three of five added parts, but these three were the most superior, so that age summary is not fully representative.

production is coming in: too long marks, many extra marks, considerable verbalization. Beginning of interest in placement suggested by foot to the left. Verbal interest in sex expressed by naming man of same sex as speaker and by addition of umbilicus.

c. $3\frac{1}{2}$ years. All add parts, only 38 per cent add accessory marks. Average number of parts is 4; of marks, 1. Parts most commonly added are four of the following: leg, foot, arm, hand, hair, and ear, in that order. Leg is too near other, and too long, but at a correct angle. Foot points toward the right, and is too short. Arm is placed too low, points downward and is too long. May even be placed on wrong side of body. Fingers are too long and may be three in number, or a line at right angles to arm, or just a wavy continuation of the arm. Hair consists of about 7 vertical strokes, too long and too far around. Ear is correctly placed but too large and wrong shape. May be a downward loop. A few add an umbilicus. Accessory marks are single marks on man; or effect closure by encircling the man or connecting parts.

Characteristic of this age are short, wavy lines. Parts are added, and there is some restraint. Restriction and closure, both verbal and manual, come in. Fewer add accessory marks, and fewer parts are added. Arm, leg, and foot are all too small in a large number of cases. Accessory marks effect closure. Scribbling and uncontrolled markings drop out. Effort at placement is shown in arm pointing down. For the first time, all add parts and very few add marks.

d. 4 years. All add parts, only 33 per cent add accessory marks. Average number of parts is 6; of marks, .5. Parts most commonly added are: leg, foot, arm, hand, eye, ear—in that order. Leg is too near other and too long, though at a correct angle. Foot turns to right and is too long. Arm is too low, points down, and is too long. May be on wrong side of body. Fingers are too long and may be three in number, or an extension of the arm, or a line at right angles to arm. Eyes are open circles, unevenly placed and of uneven size. Hair is too far around. Ear is correctly placed or too low, and mostly too large. May be a downward loop. A few add an umbilicus. Accessory marks are mostly on man and may be added to effect symmetry. Lines are firm and may be long or short.

Four is an age of over-productiveness, of inaccurate placement of "out-of-bounds" behavior. There is a marked increase in the number of parts added, and they are all too long. Hair going too far around and being too long, combined with ear being placed low and pointing down may give the man a "wild" appearance. Verbalization is beginning to express a marginal interest in such outside things as the person who drew the man. This is the chief age for filling in the man. Criticism of man is expressed verbally, and by addition of extra marks to effect symmetry. Apparent effort to place arm correctly is conspicuously unsuccessful.

e. 4½ years. As at 4 years, all add parts and 33 per cent add accessory marks. Average number of parts added is 7, of marks, .5. Parts most commonly added are 7 of the following: leg, foot, arm, hand, ear, eye, hair, neckline—in that order. Leg is too near other, too straight down, and too long. Foot is toward the right and too long. Arm is too low, straight out, too long. Fingers are three, a line at right angles to arm, or hoe-shaped. They are usually too long. Ear is placed correctly. May be correct shape but too small, or a downward loop. Eyes in half the cases are open circles, and in half the cases are filled in dots. In half they are evenly placed; in half, unevenly. They are of uneven size. Hair is, on the average, 6 vertical strokes, too long but in the right place. Accessory marks are on the man, effecting for the most part either closure or symmetry. Lines are firm and shorter than formerly. Even more than *four*, this is an age of overproduction, talkativeness, and criticalness. Parts are still for the most part too large. Hair is still too long though it has receded to proper placement. Child is extremely verbal, talking the most of at any age. Peaks for number of words, questioning about person who drew, saying they don't know and then naming, occur at this age, and boasting and criticizing man occur frequently. Accessory marks are chiefly for symmetry or closure. Efforts at symmetry are still ineffective, as arm and leg are placed and angled incorrectly.

f. 5 years. All add parts, and 66 per cent add accessory marks. Average number of parts is 9; of marks, 1. Parts most commonly added are: leg, foot, arm, hand, ear, eyes, hair, neckline, and neck or buttons, in that order. Leg may be placed correctly and of

right length, though too straight down. Foot points toward the right and is the correct length. Arm is too low, straight out and too long. Fingers are too long, and three in number. Ear is placed correctly or too low, mostly of wrong shape and too small. Eyes are filled in dots, placed correctly but of uneven size. Hair averages 9 vertical strokes. It may be of right length and is in the right place. All accessory marks are on man and are added to effect either closure or symmetry. Lines are firm and mostly short.

The *five-year-old man* is coming into focus. He appears neater and more precise. Placement of parts is much improved, angles and sizes are better—fewer lines are too long or too thick. Accessory marks are neat and confined to efforts at improving symmetry of the man. Verbalization decreases and is somewhat more to the point—less about marginal things.

g. 6 years. All add parts; none add accessory marks. Average number of parts is 9. Parts most commonly added are: leg, foot, arm, hand, ear, eyes, hair, neckline, buttons. Or order may be: arm, hand, leg, foot, eyes, hair, ear, neckline, buttons. Leg is correctly placed, at correct angle and of the right length. Foot turns to the right and is of the right length. Arm is in the right place and points upward, though still too long. Fingers are three, or a line at right angles to the arm. They are of the right length. Ear is correctly placed and of the right size and shape, or too round. Eyes are filled in dots, placed correctly and of even size. Hair consists of an average of 8 vertical strokes, right size and place. Lines are firm, mostly short.

The *six-year-old* comes even more clearly into focus than the five. All parts are placed correctly and all are at a good angle. Nearly all parts are of a correct size. No accessory marks are added. Verbalization is brief and very much to the point. Man is named only man or boy, in place, of the former diverse naming.

C. SUMMARY BY MEMBERS

1. *Hair*

a. 3 years.

(1). *Average.* A scribble, usually horizontal.

(2). *Superior.* A horizontal, circular, or vertical scribble, at the top of the head.

b. $3\frac{1}{2}$ years.

(1). *Superior*. Vertical strokes, average of 7, too long and too far around.

c. 4 years.

(1). *Average*. Vertical marks, average of 23, too long and too far around.

(2). *Superior*. Vertical strokes, average of 9, too long and too far around.

d. $4\frac{1}{2}$ years.

(1). *Average*. Vertical marks, average of 4, too long but in the right place.

(2). *Superior*. Average of 6 vertical marks, too long but in the right place.

e. 5 years.

(1). *Average*. Vertical marks, average of 9, too long but in the right place.

(2). *Superior*. Vertical marks, average of 9, too long or right length; in the right place.

f. 6 years.

(1). *Average*. Vertical marks, average of 7, right length and in right place.

(2). *Superior*. Vertical marks, average of 8, right length and in right place.

g. *Comment*. Hair is not added by 50 per cent of the average cases until 5 years. It is, at that age, usually the sixth part to be drawn. It is added by 50 per cent of the superior cases at $3\frac{1}{2}$ years. It is usually, at the earlier ages, the sixth part to be drawn. The general trend is that a horizontal scribble gives way to vertical strokes. Hair is placed correctly ($4\frac{1}{2}$ years for both groups) before it is of the right length (6 years for averages; 5 years for superiors). At $4\frac{1}{2}$ years both groups have the fewest strokes. There is a steady increase in the number who place hair correctly in the average group; fluctuation in placement for superiors; and in number of lines for both groups. At $4\frac{1}{2}$ years averages have fewest strokes but largest percentage have hair too long.

2. Eyes

a. $2\frac{1}{2}$ years.

(1). *Superior.* Eyes are open circles or circular scribbles.

b. 3 years.

(1). *Average.* Eyes are somewhat circular scribbles which may, however, be made up of straight, not circular, lines. All are placed unevenly (with respect to each other) and are of uneven size (with respect to each other).

(2). *Superior.* Forty-two per cent are open circles; 75 per cent are placed unevenly (with respect to each other); and 50 per cent are of uneven size.

c. 3½ years.

(1). *Superior.* Sixty-two per cent of eyes are open circles. All are placed unevenly and 83 per cent are of uneven size.

d. 4 years.

(1). *Average.* Fifty per cent are large open circles, others vary; 50 per cent are unevenly placed, 50 per cent are evenly placed; 50 per cent are of uneven size, 50 per cent are even.

(2). *Superior.* Sixty-two per cent of eyes are open circles; 60 per cent are placed unevenly, and 60 per cent are of uneven size.

e. 4½ years.

(1). *Average.* Seventy-one per cent are open circles; 71 per cent are unevenly placed, but 57 per cent are of an even size.

(2). *Superior.* Half draw open circles, half closed in dots, for eyes. Half place eyes unevenly, half evenly; 58 per cent of uneven size.

f. 5 years.

(1). *Average.* Eyes have become filled in dots (55 per cent of cases); 58 per cent are placed evenly but only 30 per cent are of even size.

(2). *Superior.* Eighty per cent of eyes are filled in dots; 57 per cent are placed correctly, but only 43 per cent are of even size.

g. 6 years.

(1). *Average.* Eyes are filled in dots (66 per cent); 66 per cent are placed evenly and 75 per cent are of even size.

(2). *Superior.* Sixty per cent of eyes are filled in dots, 75 per cent are placed correctly, and all are of even size.

h. Comment. Eyes are added by one-third of the average cases at 3 years and thereafter; by half the cases at 5 years and thereafter.

They are usually the fifth part to be drawn. Eyes are added by 50 per cent of the superior cases at $2\frac{1}{2}$ years, and again at 4 years and thereafter. They are usually the fifth part to be drawn.

3. Ears

a. $2\frac{1}{2}$ years.

(1). *Superior.* All are placed about right. One-third are about the right shape; two-thirds are a circular scribble.

b. 3 years.

(1). *Average.* Ears are in approximately the right place in all cases when added. Tend to be an upward vertical line rather than a loop.

(2). *Superior.* About two-thirds are correctly placed; 16 per cent are of the right shape, 33 per cent are a vertical scribble, 33 per cent an outward loop. Thirty-three per cent are too large, 50 per cent too small. There is much variety in size and shape.

c. $3\frac{1}{2}$ years.

(1). *Superior.* Ninety-one per cent are correctly placed, none are the right size and shape. Forty-five per cent are a too large loop; 18 per cent are a downward loop.

d. 4 years.

(1). *Average.* Half are placed too high, half correct. Considerable variety in shape; with a tendency toward pointedness. All are too large.

(2). *Superior.* Only 61 per cent are correctly placed. Twenty-two per cent are too low, 17 per cent too high. Forty-five per cent are too large, 20 per cent too small. Fifteen per cent are a downward loop; 10 per cent the right size and shape.

e. $4\frac{1}{2}$ years.

(1). *Average.* One-third are placed too low; two-thirds are placed correctly. Too large, tend to be circular, and may overlap headline.

(2). *Superior.* Again a large number (22 per cent) are placed too low, 11 per cent too high, 66 per cent correct. Twenty per cent are a downward loop, 40 per cent too small, 30 per cent too large. Less variety in shape than formerly.

f. 5 years.

(1). *Average.* One-third are placed too low, one-half correctly. For the first time some ears approximate the correct size (20 per cent) and shape (8 per cent); 33 per cent are too large, 12 per cent have a downward loop and 20 per cent point upward.

(2). *Superior.* The greatest number of any age (37 per cent) are placed too low; 63 per cent correct; 9 per cent are of the right size and shape, 18 per cent are a downward loop, 36 per cent too small, 18 per cent too round.

g. 6 years.

(1). *Average.* Eighty-three per cent are correctly placed, 33 per cent correct size and shape, 50 per cent are too large, 8 per cent each point up and down.

(2). *Superior.* Eighty per cent are correctly placed, 20 per cent too low, 40 per cent are the right size and shape, 40 per cent too round, 20 per cent too small.

h. Comment. An ear is added by 50 per cent of the average cases at 5 and 6 years. It is the eighth part to be drawn, usually following eyes, hair, and neck. An ear is added by 50 per cent of the superior cases at all ages except 3 years. It is the fifth to seventh part added.

4. Arm

a. 2½ years.

(1). *Superior.* Too high or too low, slants down, and is too long.

b. 3 years.

(1). *Average.* Placement is approximately correct, but arm is a small loop.

(2). *Superior.* Too low, points too far up, is too long.

c. 4 years.

(1). *Average.* Placed too low, points downward and is too long.

(2). *Superior.* Too low, points down, is too long. May be on "wrong" side of body (the same holds for 3½ years).

d. 4½ years.

(1). *Average.* Placed too low and points downward, 50 per cent are of the right length.

(2). *Superior.* Too low, straight out, half right length, half too long.

e. 5 years.

(1). *Average.* Placed correctly, points straight out and is too long.

(2). *Superior.* Too low, straight out, too long.

f. 6 years.

(1). *Average.* Placed correctly, points upward and is still too long.

(2). *Superior.* Right place, points up, still too long.

g. Comment. An arm is added by a majority of average cases at 4 years and thereafter. It is usually the third part to be drawn and is customarily drawn from the body outward. An arm is added by a majority of superior cases at 2½ years and thereafter. It is usually the third part to be drawn. It is placed correctly before it becomes of the right size.

5. Fingers

The development of fingers is described in Table 3.

TABLE 3
SIZE AND SHAPE OF FINGERS

	Too long	Right length	ξ—	+—	Three digits	Radial digits	Hoe hand
<i>Averages</i>	Per cent of cases showing each type of behavior						
3 years	—	—	—	—	—	—	—
4 years	27	9	9	9	45	9	0
4½ years	11	11	0	22	55	11	0
5 years	41	25	0	2	72	14	2
6 years	43	31	0	0	75	6	0
<i>Superiors</i>	—	—	—	—	—	—	—
2½-3 years	—	—	—	—	—	—	—
3½ years	100	0	37	24	37	0	0
4 years	69	31	37	25	43	0	0
4½ years	91	9	0	16	92	8	16
5 years	90	10	0	0	73	9	9
6 years	40	60	0	16	83	0	0

Summary. (Note more variety in kinds of fingers in superiors).

Averages:

- 4 years: 3 fingers
- 4½ years: 3 fingers or rt. angles
- 5 years: 3 fingers or a bunch
- 6 years: 3 fingers, still too long

Superiors:

- 3 years: a circle
- 3½: ξ—, rt. angle, or three
- 4 years: ξ—, rt. angle, or three
- 4½: hoe hand, rt. angle, or three
- 5 years: correct, still too long
- 6 years: three or rt. angle, correct length

6. Buttons

a. 4 years.

(1). *Average*. Only 3 per cent of cases add buttons, with an average of 10 open circles.

(2). *Superior*. Only 8 per cent add buttons, with an average of three open circles.

b. 4½ years. No buttons in either group.

c. 5 years.

(1). *Average*. Fourteen per cent add buttons, with an average of 7 open circles.

(2). *Superior*. Twenty-five per cent add buttons with an average of 4 open circles.

d. 6 years.

(1). *Average*. Eleven per cent add buttons with an average of 11 filled in dots.

(2). *Superior*. Thirty-two per cent add buttons, with an average of 5 filled in dots.

e. *Comment*. The trend in averages is from large open circles (100 per cent at 4 years, 71 per cent at 5 years) to small filled in dots (100 per cent at 6 years). This is the same trend observed for the eyes, though buttons are added at a later age than eyes and become dots later. The number of buttons tends to decrease with age though it may increase after they become dots. It is noteworthy that there are no buttons added at 4½ years, the age when the umbilicus is most conspicuous (added by 59 per cent of cases). The trend in superiors is also from large open circles (100 per cent at 4 years) to filled in dots (100 per cent at 6 years). As with average cases, no buttons are added at 4½ years. The average number of buttons increases with age as does the percentage of cases adding buttons.

7. Umbilicus

a. *Average cases*. An umbilicus is added by an appreciable number of cases at 4½ years only. Only two children of this group add genitals. They are both girls, and the age of occurrence is also 4½ years.

b. *Superior cases*. An umbilicus is added by 66 per cent of cases

at $2\frac{1}{2}$ years; by about 25 per cent from 3 to 4 years; little thereafter. Five cases of this group, three girls and two boys, add genitals. The age of occurrence is as follows. 5 per cent at $3\frac{1}{2}$ years; 8 per cent at 4 years; 6 per cent at $4\frac{1}{2}$ years; 16 per cent at 6 years.

8. *Leg*

a. $2\frac{1}{2}$ years.

(1). *Superior*. Half placed correctly, half incorrectly; leg straight down or at correct angle; too long.

b. 3 years.

(1). *Average*. Leg correctly placed, correct angle, tends to be too short.

(2). *Superior*. Too near other, straight down, too long.

c. $3\frac{1}{2}$ years.

(1). *Superior*. Too near other, correct angle, too long.

d. 4 years.

(1). *Average*. Leg correctly placed, though 36 per cent place leg too near other. Correct angle; too long.

(2). *Superior*. Too near other, correct angle, too long.

e. $4\frac{1}{2}$ years.

(1). *Average*. Correctly placed, though 33 per cent place leg too far to right; angle is straight down; right length.

(2). *Superior*. Too near other, too straight down, too long.

f. 5 years.

(1). *Average*. Correctly placed, correct angle, too long.

(2). *Superior*. Half too near, half placed correctly. Too straight down, right length.

g. 6 years.

(1). *Average*. Correctly placed, too straight down, right length.

(2). *Superior*. Correctly placed, correct angle, correct length.

h. *Comment*. A leg is added by one-third of the average cases at 3 years, and by nearly all cases at later ages. It is the first part to be drawn, and is drawn from the body outward. Leg is added by the superiors from $2\frac{1}{2}$ years following. It is the first part to be drawn.

9. *Foot*

- a. 3 years.
 - (1). *Superior*. Foot to the left and too long.
- b. $3\frac{1}{2}$ years.
 - (1). *Superior*. Foot to the right and too short.
- c. 4 years.
 - (1). *Average*. Foot to the left and too long.
 - (2). *Superior*. Foot to the right and too long.
- d. $4\frac{1}{2}$ years.
 - (1). *Average*. Foot to the right and too long.
 - (2). *Superior*. Foot to the right and too long.
- e. 5 years, 6 years.
 - (1). *Average*. Foot to the right and correct length.
 - (2). *Superior*. Foot to the right and correct length.
- f. *Comment*. A foot is first added by a majority of the average cases at 4 years. It is the second part to be drawn. It is first added by a majority of the superior cases at $3\frac{1}{2}$ years. It is the second part to be drawn.
- g. *Kind of foot*. The majority of cases add a single, horizontal line, at an angle with the leg, from the time when they first add a foot.

10. *Kinds of Lines: Superior Cases*

- a. 3 years. Thirty-three per cent are long and wavery, sixty-six per cent are long and firm.
- b. $3\frac{1}{2}$ years. Sixty-four per cent are short and wavery.
- c. 4 years. Eighteen per cent are wavery, eighty-two per cent are firm (long or short).
- d. $4\frac{1}{2}$ years. One hundred per cent are firm, mostly short, but not extremely short.
- e. 5 years. One hundred per cent are firm, mostly short.
- f. 6 years. One hundred per cent are firm, mostly short.

D. SCRIBBLING AND ACCESSORY MARKS

Fully as significant as the addition of actual parts to the man are the responses of scribbling, and the making of accessory marks which are not specifically missing parts.

At the earliest ages some of the children merely scribble over the presented form (30 per cent of the average 3-year-olds; 60 per cent of the superior $2\frac{1}{2}$ -year-olds). At the later ages some children make accessory marks of a controlled nature, not scribbling, sometimes directly connected with the form and sometimes near the margins of the paper; sometimes recognizable by the examiner, sometimes quite unrecognizable in form.

These marks are sometimes not considered in an appraisal of the child's Incomplete Man response, but since they are an integral part of his response to the test situation (at the earliest ages they may be likened to the child's early incoherent jargon out, of which emerges formed speech) they will be analyzed in detail.

A table (Table 4) and descriptive age summaries indicate the number and kind of marks typical of each age level, and indicate the main trends observed in accessory markings for the two groups. Illustrations of the accessory markings typical of each age level appear in Row 4 of Figure 2.

1. Age Summaries

a. $2\frac{1}{2}$ years.

(1). *Superior.* All make accessory marks (most of any age), with an average of 3 marks; 20 per cent make a separate figure at the side; 80 per cent of the marks are on the man; 60 per cent make a vertical scribble; but 60 per cent make controlled horizontal and vertical lines. *Scribbling is still strong but controlled marking is coming in.*

b. 3 years.

(1). *Average.* Seventy-five per cent of the cases make accessory marks (the most of any age), with an average of 1.5 marks; 10 per cent draw around the man; 10 per cent make a figure at the side; 72 per cent of the marks are on the man, mostly on fingers, foot or body; 30 per cent of the marks are horizontal, vertical or circular scribbles; 60 per cent are controlled marks. *Thus scribbling is giving way to controlled marking. Dissociation and closure both occur slightly.*

(2). *Superior.* Ninety per cent make accessory marks, with an average of 3 marks; 20 per cent of the cases encircle the man

(most of any age); and 15 per cent make a figure at the side. Eighty-six per cent of the marks are on the man. Marks are scribbling, horizontal and vertical marks, or circles, mostly on the man or encircling. Marks are on foot, leg, hand, arm, or face. *Dissociation (marks at side) and closure (encircling) predominate.*

c. $3\frac{1}{2}$ years.

(1). *Superior.* Only 38 per cent of the cases make accessory marks, with an average of 1 mark; 18 per cent encircle the man; none draw a figure at the side. Eighty-six per cent of the marks are on man, especially on his foot; 27 per cent effect closure with their marks, 71 per cent of the marks effecting closure. *Outstanding at this age are encircling of man, closure of parts and close connection of all marks to the man.*

d. 4 years.

(1). *Average.* Sixty-three per cent of the cases make accessory marks, with an average of one mark; 13 per cent draw around, 18 per cent make a figure at the side; 63 per cent of the marks are on the man, chiefly on ear, body, and leg; 13 per cent of the cases scribble, 15 per cent make controlled horizontal and vertical marks. *Largest occurrence of any age for encircling and for dissociated markings.*

(2). *Superior.* Thirty-three per cent make accessory marks with an average of .5 marks. None draw around, but 12 per cent make a figure at the side; 77 per cent of the marks are on the man, mostly on foot or body; *16 per cent add marks for symmetry, which is the new and outstanding thing at this age, and not seen in average cases.*

e. $4\frac{1}{2}$ years.

(1). *Average.* Only 40 per cent make accessory marks, with an average of one mark; 72 per cent of marks are on the man, varying as to place. *Much variety in markings at this age.*

(2). *Superior.* Again 33 per cent make accessory marks, with an average of .5 marks. None draw around and only 6 per cent make figures at side; 66 per cent of the marks are on the man, largely on legs. *The majority of the marks effect closure or symmetry.*

f. 5 years.

(1). *Average*. Twenty per cent of the cases make accessory marks with an average of .3 marks; 90 per cent of marks are on the man (most of any age), mostly on foot or mouth; 4 per cent print their name beside the man; 4 per cent add extra fingers.

(2). *Superior*. At this age 66 per cent of the cases make accessory marks, with an average of 1 mark. None encircle or make marks at the side. All marks are on the man (most of any age), chiefly on foot or leg; 41 per cent of cases make closure marks and 33 per cent make marks for symmetry, both these trends reaching their peaks at this age.

g. 6 years.

(1). *Average*. One case (5 per cent) makes his initials.

(2). *Superior*. No extra marks at this age.

2. Special Trend: Dissociation

Three types of dissociated markings observed are: Figure at one side; marks not on man; parts not connected. They occur as follows.

a. *Figure at one side*.

(1). *In average cases*. Ten per cent at 3 years, not named; 18 per cent at 4 years; 6 per cent at 4½ years; 10 per cent at 5 years; 5 per cent at 6 years.

(2). *In superior cases*. Twenty per cent at 2½ years (i.e., squirrel going up a tree); 20 per cent at 3 years (i.e., a moon). Few thereafter.

b. *Marks not on man*.

(1). *In average cases*. Number of marks not on man decreases as follows from 3 to 6 years: 28, 37, 38, 10, 5 per cent.

(2). *In superior cases*. Number of marks not on man increases as follows from 2½ to 4½ years: 20, 14, 23, 38 per cent. None thereafter.

c. *Parts not connected*.

(1). *In average cases*. Occurs very little.

(2). *In superior cases*. Occurs from 3 to 4½ years as follows: 5, 10, 4, 36 per cent, the peak occurring at 4½ years.

3. *Special Trend: Closure*

Five types of closure are observed as follows.

a. *Draws around.*

(1). *Average cases.* Ten per cent at 3 years, 13 per cent at 4 years, 6 per cent at 5 years.

(2). *Superior cases.* Only at 3 years (25 per cent) and at $3\frac{1}{2}$ years (18 per cent).

b. *Completes neckline.*

(1). *Average cases.* Appears first at 4 years, and then as follows: 33, 56, 77 per cent.

(2). *Superior cases.* Occurs more and earlier than in averages, as follows: At 3 years, 18 per cent; $3\frac{1}{2}$ years, 33 per cent; 4 years, 58 per cent; and increasingly from then on.

c. *Fills in body.* Scarcely occurs in averages (see table); and only at early ages in superiors as follows: $2\frac{1}{2}$ years, 40 per cent; 3 years, 10 per cent; $3\frac{1}{2}$ years, 11 per cent; 4 years, 8 per cent; $4\frac{1}{2}$ years, 6 per cent; 5 years, 8 per cent.

d. *Extra marks take form of closing things in (exclusive of circling).* Scarcely occurs in averages (see table). Occurs notably in superiors as follows: $3\frac{1}{2}$ years, 27 per cent (mostly leg up to meet body); $4\frac{1}{2}$ years, 29 per cent (leg up to body or closes in leg); 5 years, 41 per cent (closes in feet and legs, making them two-dimensional).

e. *Verbal closure of the situation.* Occurs to any extent in superiors only, 5 per cent at 3 years; 22 per cent at $3\frac{1}{2}$; 13 per cent at $4\frac{1}{2}$; 16 per cent at 5 years.

f. *Genetic summary of kinds of closure.*

(1). *Average cases.* Little except a rough encircling at 4 years.

(2). *Superior cases.* These cases show a clear developmental sequence as follows:

(a). $2\frac{1}{2}$ years. Filling in of body (40 per cent).

(b). 3 years. Draws around (25 per cent); completes neckline (18 per cent); and closes in specific parts (i.e., arm comes up to meet ear).

(c). $3\frac{1}{2}$ years. Draws around (18 per cent); completes neckline (33 per cent); and completes specific parts. (27 per cent).

Also makes hair too far around. Verbal closure of the situation (22 per cent).

(d). 4 years. Completes neckline (58 per cent); makes hair too far around; toe up to meet trunk; two-dimensional leg.

(e). 4½ years. Completes specific parts (29 per cent), as leg up to meet trunk or two-dimensional leg. Verbal closure of situation (13 per cent); and completes neckline (66 per cent).

(f). 5 years. Forty-one per cent of marks (most of any age) close in specific parts, especially making two-dimensional legs and feet; 75 per cent close in neckline; 16 per cent have verbal closure.

(g). 6 years. None.

4. *General Comparison of Two Groups Re. Accessory Marks*

The number of average cases who make accessory marks, and the number of marks, decreases with age. In superiors this is also true except that at 5 years superiors again add accessory marks. Accessory marks added by averages vary considerably from child to child and are difficult to classify, having little apparent or definable purpose. Marks added by superiors appear more purposeful, and have an apparent function, which undergoes definite age changes. In general it appears that the average cases add accessory marks rather as a form of scribbling—superiors add accessory marks earlier and later, and at all ages with an apparently purposeful intent. Noteworthy is the addition of such marks to effect symmetry, so conspicuous in superiors from 4 to 5 years and not seen in average cases. Average cases appear to add marks instead of parts (when they add marks); superiors appear to add marks, purposefully and in addition to parts.

E. SYMMETRY AND PROPORTION

The task suggested for the child by the instructions given is to finish the man. He presumably attempts, as he grows older, to add parts like the ones already present. The added parts may resemble—or not resemble—the original parts with respect to the following characteristics: size, placement, and direction or angle. These three trends are discussed in detail for both the groups.

In general, parts are too long at first and gradually become of the right size; are placed incorrectly at first and gradually more correctly; and are added at an incorrect angle early and at an accurate angle later. This development does not as a rule take place in a straightline fashion. Parts are often too large, too small, too large again, and finally correct, with advancing age. Similar fluctuation of development takes place with respect to angle and placement. This fluctuation is in all probability not a mere irregularity, but a manifestation of the principle of reciprocal interweaving (Gesell, 2).

Summarized roughly by members, the development toward symmetry occurs as follows:

Hair recedes, becomes fewer in strokes and shorter.

Eyes become smaller and more filled in, more even in size, and more evenly placed with respect to each other and to the nose.

Ear moves up, becomes smaller and more circular, and ceases to overlap the headline.

Arm moves upward; slants downward, then straight out, then upward; and becomes shorter.

Fingers are first a circle, then an extension of the arm, then at right angles to arm, and finally three lines at correct angle. They gradually shorten.

Umbilicus comes in from $2\frac{1}{2}$ to $4\frac{1}{2}$ (in averages mostly at $4\frac{1}{2}$) and then drops out.

Buttons become smaller and more filled in. They are omitted (in both groups), at the ages when umbilicus is prominent.

Leg placement and angle are fairly good throughout. Leg becomes shorter with increasing age of child.

Foot turns from left to right and becomes gradually shorter.

1. Size of Parts

a. Hair.

- (1). *Averages*. Too long from 4-5 years; correct at 6 years.
- (2). *Superiors*. Too long from $3\frac{1}{2}$ to $4\frac{1}{2}$ years; quite evenly divided between too long, too short, and correct at 5 years; correct at 6 years.

b. Ear.

- (1). *Averages*. Too large at all ages, with increasing number correct at 5 and 6 years.
- (2). *Superiors*. Too large at $2\frac{1}{2}$ years; too small at 3 years;

too large at $3\frac{1}{2}$ and $4\frac{1}{2}$; as many too large as too small at 5 years (36 per cent each); as many too large as correct at 6 years (+0 per cent each).

c. Arm.

(1). *Averages.* Too long at 4 years; 50 per cent each too large and correct at $4\frac{1}{2}$ years; too long at 5 and 6 years.

(2). *Superiors.* Too long from $2\frac{1}{2}$ to 4 years; 42 per cent too long and 42 per cent correct at $4\frac{1}{2}$ years; too long at 5 and 6 years.

d. Fingers.

(1). *Averages.* Too long from 4 to 6 years.

(2). *Superiors.* Too long from $3\frac{1}{2}$ to 5 years. Correct at 6 years.

e. Leg.

(1). *Averages.* Too long at 4 years; correct at $4\frac{1}{2}$; too long at 5; correct at 6.

(2). *Superiors.* Too long from $2\frac{1}{2}$ to $4\frac{1}{2}$ years; correct at 5; too short at 6.

f. Foot.

(1). *Averages.* Too long at 4 and $4\frac{1}{2}$ years; 37 per cent too long, 37 per cent correct at 5 years; correct at 6 years.

(2). *Superiors.* Too long at 3 years; too short at $3\frac{1}{2}$ years; too long at 4 and $4\frac{1}{2}$ years; correct at 5 and 6 years.

2. Comparison of Two Groups as to Size of Parts

Considerable similarity in age of reaching correct size, though the superiors tend to lead. Superiors are advanced with respect to hair, ear, fingers, leg, and foot, though usually by but one age level. There is more fluctuation in superiors, that is, parts are too small at one age, too large at the next, and then once again too small. This may be the result of an exaggerated effort by children in this group to attain the correct size.

3. Placement of Parts Added

a. Hair.

(1). *Averages.* Too far around at 4 years; in the right place at $4\frac{1}{2}$ and thereafter.

TABLE 5

SIZES OF PARTS

[illegible]

(2). *Superiors*. Too far around at $3\frac{1}{2}$ and 4 years; in the right place at $4\frac{1}{2}$ and thereafter.

b. *Eyes*.

(1). *Averages*. Eyes placed evenly (in line with each other) at 3 years; half evenly half unevenly at 4 years; unevenly (71 per cent) at $4\frac{1}{2}$ years; even at 5 and 6 years.

(2). *Superiors*. Eyes placed unevenly at 3 years (75 per cent); 100 per cent are uneven at $3\frac{1}{2}$ years; 60 per cent at 4 years. Half and half at $4\frac{1}{2}$; placed evenly at 5 and 6 years.

c. *Ear*. Ear is correctly placed by at least 50 per cent of both groups at all ages. In both groups, however, there are at certain ages marked decreases in the number of children who place the ear correctly: in averages, at 4, $4\frac{1}{2}$ and 5 years; in superiors, at 3, 4, $4\frac{1}{2}$ and 5 years. Largest number are placed too low at $4\frac{1}{2}$ and 5 years in averages; at 5 years in superiors.

d. *Arm*.

(1). *Averages*. In right place at 3 years, too low at 4 and $4\frac{1}{2}$ years, correct at 5 and 6 years.

(2). *Superiors*. Half place arm too high and half too low at $2\frac{1}{2}$ years. It is placed too low at every age from 3 to 5 years, correct at 6 years.

e. *Leg*.

(1). *Averages*. Leg is correctly placed in a majority of cases at all ages. The largest number of incorrect placements is at 4 years (too near other leg), and at $4\frac{1}{2}$ years (too far to the right).

(2). *Superiors*. Half place leg correctly, half incorrectly at $2\frac{1}{2}$ years. Leg is too near other at 3, $3\frac{1}{2}$, 4, $4\frac{1}{2}$ years. Half too near, half correct at 5 years; correct at 6 years.

4. *Angles and Directions of Lines*

a. *Arm*.

(1). *Averages*. Arm points predominantly downward at 4 and $4\frac{1}{2}$ years; straight out at 5 years; and upward at 6 years.

(2). *Superiors*. Arm points up, but too far up, at 3 years; and otherwise the trend is the same as in the average cases, though arm points straight earlier than in the averages (i.e., $4\frac{1}{2}$ years).

b. *Leg*.

TABLE 6
PLACEMENT OF PARTS ADDED

PLACEMENT OF PARTS ADDED													
	Average cases					Per cent of cases							
	3 yrs.	4 yrs.	4½ yrs.	5 yrs.	6 yrs.	2½ yrs.	3 yrs.	3½ yrs.	4 yrs.	4½ yrs.	5 yrs.	6 yrs.	
<i>Hair</i>													
Way around	—	33	—	13	6	—	—	—	11	27	0	0	
Too far around	—	66	—	27	6	—	—	—	22	64	7	26	
Right place	—	0	75	72	90	—	—	—	0	36	93	74	
<i>Eyes</i>													
Placed unevenly	0	50	71	42	34	—	75	100	60	50	43	25	
Placed evenly	100	50	29	53	66	—	25	0	40	50	57	75	
<i>Ear</i>													
Too high	0	50	0	15	0	0	16	0	17	11	0	0	
Too low	0	0	33	34	17	0	16	9	22	22	37	20	
Right place	100	50	66	50	83	100	66	91	61	66	63	80	
<i>Arm</i>													
Too high	0	15	0	12	0	50	12	0	16	7	22	10	
Too low	0	53	90	34	7	50	88	77	63	61	44	40	
Right place	100	38	10	53	93	0	0	23	21	31	33	50	
<i>Leg</i>													
Too far to right	0	18	33	12	11	0	0	8	28	26	18	20	
Too near other	0	36	6	14	5	50	80	50	45	40	41	30	
Right place	100	45	60	72	83	50	20	42	23	34	41	50	

TABLE 7
ANGLES AND DIRECTIONS OF LINES

	Number of cases									
	Average cases					Superior cases				
	4 yrs.	4½ yrs.	5 yrs.	6 yrs.	3 yrs.	3½ yrs.	4 yrs.	4½ yrs.	5 yrs.	6 yrs.
<i>Arm</i>										
Downward	7	5	10	4	1	6	7	5	0	1
Straight out	5	2	19	5	1	4	6	7	5	0
Too far up	0	2	4	1	5	3	4	1	2	2
Upward	2	3	12	7	2	0	4	1	4	3
<i>Leg</i>										
Parallels other	3	0	4	3	1	1	1	1	0	0
Straight down	7	8	20	8	5	4	10	6	8	1
Too much to right	3	0	1	1	1	1	2	4	1	2
Correct	8	7	22	6	3	6	11	4	3	3
<i>Ear</i>										
Downward	0	0	3	1	0	2	3	2	2	0
Correct	0	0	2	4	1	0	2	0	1	3
<i>Foot</i>										
To left	11	5	22	8	3	4	5	4	5	1
To right	7	7	24	10	2	8	15	10	7	5

TABLE 8
DIRECTION OF FOOT AND HANDEDNESS

	Average cases		Number of cases		Superior cases	
	Handedness		Handedness		Handedness	
	Right	Left	Ambilateral	Total	Right	Left
<i>3 years</i>						
Foot to right	—	—	—	—	2	0
Foot to left	—	—	—	—	2	1
<i>3½ years</i>						
Foot to right	—	—	—	—	8	0
Foot to left	—	—	—	—	2	2
<i>4 years</i>						
Foot to right	7	0	0	7	11	4
Foot to left	5	2	4	11	4	1
<i>4½ years</i>						
Foot to right	7	0	0	7	9	1
Foot to left	2	1	2	5	2	2
<i>5 years</i>						
Foot to right	16	4	4	24	5	2
Foot to left	14	4	4	22	3	2
<i>6 years</i>						
Foot to right	8	2	0	10	5	0
Foot to left	1	3	4	8	0	1

Summary. Averages: At all ages combined—

46 draw foot to left: 10 are left handed, 22 right, 14 ambilateral.

48 draw foot to right: 6 are left handed, 38 right, 4 ambilateral.

Superiors: At all ages combined—

22 draw foot to left: 9 are left handed, 13 are right handed.

47 draw foot to right: 7 are left handed, 40 are right handed

(1). *Averages.* Considerable variation from child to child. No strong trend. Leg alternates between being directed straight down, and being placed at a correct angle.

(2). *Superiors.* The same trends as in average cases.

c. *Ear.*

(1). *Averages.* Ear points downward at 5 years; upward at 6 years.

(2). *Superiors.* Ear points predominantly downward at all ages from $3\frac{1}{2}$ to 5 years; then upward at 6 years.

d. *Foot.*

(1). *Averages.* Foot to the left at 4 years; to the right thereafter.

(2). *Superiors.* Foot to the left at 3 years; to the right thereafter.

e. *Direction of foot and handedness.*

(1). *Averages.* At 4, $4\frac{1}{2}$, and 6 years, right handed children predominantly draw feet to the right; left handed or ambilateral children predominantly draw feet to the left. At 5 years children with all types of handedness draw feet about half to the right and half to the left. However, *at all ages*, some right handed children draw feet to the left; and more right handed children draw feet to the left than vice versa. Foot is drawn to the left by a majority of children at 4 years, and by nearly half the cases at all ages. Five years is the first age when left handed children have foot pointing to the right.

(2). *Superiors.* As the table shows, in general right handed children predominantly draw feet to the right, left handed children to the left; but some of each group do just the reverse. Foot is drawn to the left by a majority of cases at 3 years, and predominantly to the right thereafter, though foot to left is strong at 5 years. Four years is the first age when left handed children have foot pointing to the right.

(3). *Comparative summary for two groups.* Same trends in both groups: left handed children drawing feet predominantly to the left and right handed children to the right, but many right handed children drawing foot to the left at all ages. Left handed children draw foot to right usually at one age only, superiors at 4 years,

averages at 5 years. This suggests that handedness may influence direction of foot but that it is probably not the sole determining factor.

f. Arm angle and direction of foot.

(1). 3 years.

(a). *Superiors*. Arm up, foot to left.

(2). 3½ years.

(a). *Superiors*. Varied. Arm on wrong side, foot to left; arm down, foot to left or right; arm straight, foot to right; arm up, foot to right. Arm down most.

(3). 4 years.

(a). *Averages*. Varied. Arm down, foot to left or right; or arm straight, foot to left.

(b). *Superiors*. Arm up, foot to right.

(4). 4½ years.

(a). *Averages*. Arm down, foot to left.

(b). *Superiors*. Arm down, foot to right.

(5). 5 years.

(a). *Averages*. Arm straight, foot to right.

(b). *Superiors*. Arm straight, foot to left; or arm up, foot to right.

(6). 6 years.

(a). *Averages*. Arm up, foot to right.

(b). *Superiors*. Arm up, foot to right.

(7). *Comparative summary for the two groups*. The trend is that the arm moves upward, turning upward as it goes. At earlier ages it may even appear on the "wrong" side of the body. At the same time the foot turns from left to right. Foot turns to right at about the same time that arm points straight out, and therefore *before* arm assumes the correct position.

The best sequence appears in the averages. Individual superior cases do not show as clear a sequence, since in superiors foot turns right by 3½ years, before arm angle turns upward. Thus we do not get a combination of foot to left and arm down, as in averages.

Illustrations of symmetric behavior appear especially in Figure 2, Row 5.

1

5. *Illustrations of Typical Responses*

Figure 2 presents typical responses of the average and of the superior cases to the Incomplete Man Test at each age level. These illustrations are reproductions of the behavior of actual children, but are given as illustrations of typical rather than individual cases. The age represented is indicated in the lower left hand corner of each picture. *Av* indicates "average" responses; *Sup* indicates "superior." Row 1 presents typical responses of average cases; Rows 2 and 3, of superior cases. Row 4 illustrates typical accessory markings of superior cases from 2½ to 5 years. The last row illustrates efforts at symmetry, as follows: (a) Responses of Boy *WR*, 4 years, to Incomplete Man Test; (b) effort at symmetry shown in foot, arm, ear, eye, and hair placement (not an actual case); (c) draw-a-man response, Girl *JN*, 4 years; (d) draw-a-man response, Boy *KC*, 5 years.

F. VERBALIZATION

A table (Table 9) and descriptive age summaries present the trends in verbalization accompanying drawing behavior, and indicate the extent and kind of verbalization typical of each age, for the two groups separately. A further table (Table 10) indicates sex differences in naming the man.

1. *Age Summaries*a. *Average cases.*

(1). *3 years.* All verbalize, 52 per cent further than naming. Average number of words is 6 (range 5-8 words); 100 per cent of girls and 78 per cent of boys call the figure a man or boy, mostly a man.

(2). *4 years.* Eighty-three per cent verbalize, 60 per cent further than just naming. Average of 13 words (range 3-43 words); 77 per cent of boys call the figure a man or boy; 75 per cent of girls call it a girl. The largest number call the figure a girl at this age of any age. (This verbal interest in sex precedes the addition of an umbilicus at 4½). Seventeen per cent call it some kind of animal.

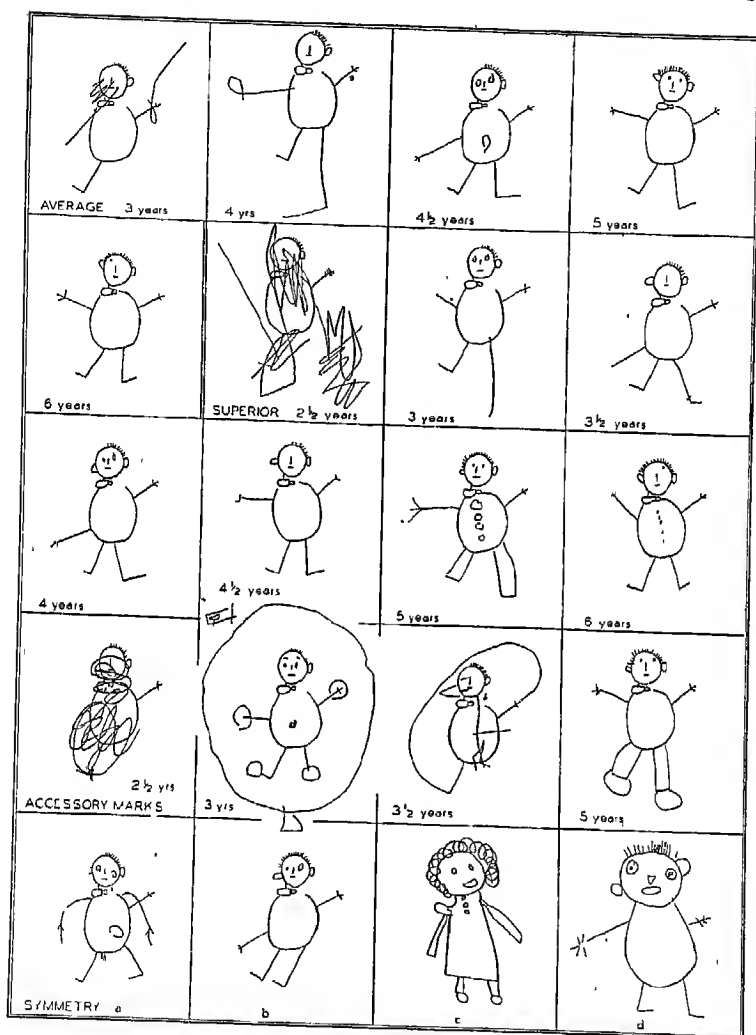


FIGURE 2
TYPICAL RESPONSES

(3). $4\frac{1}{2}$ years. Seventy per cent verbalize, 26 per cent further than naming. Average number of words is 17 (range 7-23). All the boys and 66 per cent of the girls call the figure a man or boy, mostly *man*.

TABLE 9
COMPARATIVE TABLE OF VERBALIZATIONS

	Per cent of cases											
	Average cases				Superior cases							
	3 yrs.	4 yrs.	4½ yrs.	5 yrs.	6 yrs.	2½ yrs.	3 yrs.	3½ yrs.	4 yrs.	4½ yrs.	5 yrs.	6 yrs.
Just name	46	23	44	8	8	20	20	11	17	15	0	20
Name + adjective	26	16	6	0	0	0	5	5	8	0	0	0
Comment further	26	44	20	90	92	40	65	88	74	85	100	80
Average number of words	6	13	17	20	13	11	22	20	20	38	24	16
Go on after "What else?"	13	7	13	72	45	0	20	11	20	13	41	0
Verbal, better than perform	13	11	0	6	0	60	15	0	4	6	8	0
Talk about person who drew	13	+	—	10	5	0	5	16	20	40	33	0
Say don't know, then name	0	5	0	6	0	0	0	5	20	26	8	15
Boast, "Easy," "better"	0	0	—	0	0	0	0	0	0	13	25	0
Mention blackness or color	7	7	—	10	0	0	0	11	12	13	16	0
Criticize man	13	21	—	16	11	0	15	16	12	25	33	33
Name it: boy	33	21	10	10	40	0	5	5	40	42	33	50
man	46	21	60	58	30	40	15	16	16	6	25	33
girl	13	32	20	21	10	0	30	11	12	0	25	0
animal	0	17	0	2	0	20	5	25	13	13	0	0
snowman	0	0	0	2	20	0	5	0	4	18	8	0

(4). 5 years. All verbalize, 90 per cent further than naming. Average number of words is 20 (range 4-94). About 80 per cent of both girls and boys name the figure a man or boy, mostly *man*; 72 per cent go on after what else; 10 per cent mention person who drew; 10 per cent mention blackness or color of man; 16 per cent criticize man.

(5). 6 years. All verbalize, 92 per cent further than naming. Average is 13 words (range 4-27 words). All boys and 75 per cent of girls name the figure a man or boy, mostly *boy*; 20 per cent name figure a snowman; 45 per cent go on after what else; 11 per cent criticize man.

b. *Superior cases.*

(1). 2½ years. All verbalize, 40 per cent further than naming. Average says 11 words (range 8-24 words). No boys name it; most girls call it a *man*; 60 per cent verbalize better than perform.

(2). 3 years. Twenty per cent just name; 65 per cent comment further. Average says 22 words (range 2-40 words); 83 per cent of girls call it a girl; 83 per cent of boys call it a boy. This is the strongest age for naming it of own sex. The figure is named a *girl* by most. Only 15 per cent verbalize better than perform. Criticism of man and mention of person who drew come in for the first time; also going on after the verbal stimulus of "What else?" Also mentioning blackness or color of man.

(3). 3½ years. Eighty-eight per cent comment more than just naming; average of 20 words (range 7-44 words). All boys and 60 per cent of the girls call it a boy or man, chiefly a *man*. A large number, (25 per cent) call it an animal. There is mention of the person who drew it; of blackness; of action on the part of the man; 16 per cent criticize, 11 per cent go on after what else; 5 per cent say they don't know what it is and then name it; 33 per cent close the situation verbally—the most of any age.

(4). 4 years. Seventy-four per cent comment further than naming, an average of 20 words (range 4-64 words); 88 per cent of boys and 72 per cent of girls call it a boy or man, mostly *boy*. There is mention of the person who drew, of blackness or color; 12 per cent criticize, mostly calling it "funny." Twenty per cent go on after "What else?"; 20 per cent name after saying they don't know.

TABLE 10
SEX DIFFERENCES IN NAMING

Age		Per cent of cases			
		Name figure a girl		Name figure boy or man	
		Averages	Superiors	Averages	Superiors
2½ years.	Girls	—	0	—	100
	Boys	—	0	—	0
3 years.	Girls	0	33	100	16
	Boys	22	16	78	33
3½ years.	Girls	—	40	—	60
	Boys	—	0	—	100
4 years.	Girls	75	28	25	72
	Boys	23	12	77	38
4½ years.	Girls	33	15	66	35
	Boys	0	0	100	100
5 years.	Girls	21	34	79	66
	Boys	18	0	82	100
6 years.	Girls	25	0	75	100
	Boys	0	0	100	100

(5). 4½ years. Eighty-five per cent comment further than just naming, an average of 38 words (range 16-110), the most at any age and greatest range. All boys and 85 per cent of girls call it boy or man, mostly *boy*; 13 per cent call it an animal and 18 per cent a snowman; 40 per cent, most of any age, talk about person who drew. Twenty-six per cent, also most of any age, say they don't know before naming. Boasting in regard to their own ability comes in. Twenty-five per cent criticize the man, 13 per cent mention blackness; 13 per cent go on after what else.

(6). 5 years. One hundred per cent comment further than naming, an average of 24 words (range 7-88), fewer words than at 4½ years. All boys and 66 per cent of girls call it a boy; 41 per cent, the most of any age, go on after "What else"; 33 per cent mention person who drew; 25 per cent boasts; 44 criticize man; 16 per cent, most of any age, mention blackness or color. Sixteen per cent, most of any age, mention making the man before. There is much use of the word *needs*, listing of missing parts, talk of outside things.

(7). 6 years. Eighty per cent verbalize further than naming; average number of words is 16 (range 8-25). All of both sexes call it a boy or man, mostly *boy*; 15 per cent say they don't know

and then name; 33 per cent criticize. Most of the kinds of verbalization noted earlier no longer occur. None go on after "What else?" None verbalize better than perform; none talk about person who drew; none boast; none mention color of lines. No talk of outside things. Group has narrowed down in variety of naming—all name figure either man or boy. Some list missing parts. Answers are more discriminating. "A little girl without any eyes."

b. Special trends in verbalization.

(1). *Naming figure.*

(a). *Averages.* Figure is named (by largest per cent of cases) a man, a girl, a man, a man, a boy, at successive age levels. At all but one age more girls than boys call it a girl. At no age do 100 per cent of the children call the figure some male person. Four years is the outstanding age for naming it of same sex as speaker. At 4 years a notable percentage (17 per cent) call figure some kind of animal; at 6 years, 20 per cent name it a snowman. Group variation in naming tends to decrease with age from 3 to 6 years as follows: 6 different names; 10 different names; 4 different names; 7 different names; 4 different names.

(b). *Superiors.* Figure is named (by largest percentage of cases) a man, a girl, a man, a boy, a boy, a boy, at successive age levels. At five of seven age levels more girls than boys call it a girl. Three years is the outstanding age for calling it of the same sex as the speaker. At 6 years all the children call the figure some male person. The figure is called some kind of an animal at $2\frac{1}{2}$ to $4\frac{1}{2}$ years; a snowman notably at $4\frac{1}{2}$ years. Group variation in naming tends to decrease from $2\frac{1}{2}$ to 6 years, as follows: 2 different names, 8 different names, 8, 5, 6, 4, 2.

(2). *Number of words spoken.* The table shows that though the trends are the same for both groups—generally increasing number of words with a peak at 5 years and a decline at 6 years—the superiors at all ages verbalize considerably more than do the averages, at the earlier ages two or three times as much. The range is greatest in superiors at $4\frac{1}{2}$ years (16-110), less at 5 years (7-88), and much less at 6 years (8-25). In averages the range is greatest at 5 years (4-94), and less at 6 years (4-27).

(3). *Comment about blackness or color of lines.*

(a). *Averages.* Seven per cent mention it at 4 years; 10 per cent at 5 years.

Examples.

4 years. "Who colored it?"

5 years. "Needs color inside."

(b). *Superiors.* Eleven per cent at $3\frac{1}{2}$ years; 12 per cent at 4; 13 per cent at $4\frac{1}{2}$; 16 per cent at 5 years.

Examples.

$3\frac{1}{2}$ years. "Lookit the black eye. Make another black eye."

4 years. "Well how do you make all that black on it?"

$4\frac{1}{2}$ years. "Did they use a pencil? Why didn't they? How did they use ink?"

5 years. "What is it all black for? Ink?"

(4). *Say they don't know what it is and then name correctly.*

(a). *Averages.* Five per cent at 4 years; 6 per cent at 5 years.

(b). *Superiors.* Five per cent at 3 years; 20 per cent at 4 years; 26 per cent at $4\frac{1}{2}$ years; 8 per cent at 5 years; 15 per cent at 6 years. Peak at 4 to $4\frac{1}{2}$ years.

Examples

$3\frac{1}{2}$ years. "I don't really know what it is—a man."

4 years. "I don't know very good—I think it's a man."

6 years. "I don't know. I never saw anything like that before. I think it's a man."

(5). *Comment about person who drew the man.*

(a). *Averages.* This occurs at 4, 5, and 6 years, but very little: 4, 10, and 5 per cent.

(b). *Superiors.* Occurs at every age from 3 to 5 years: 5, 16, 25, 40 and 33 per cent. Occurs most at 4, $4\frac{1}{2}$, 5 years.

Typical comments are:

3 years. "Maybe Solweig made it."

$3\frac{1}{2}$ years. "Were you with him? Who was with him?"

4 years. "I wonder why they forgot to finish him. Maybe they didn't have time I guess."

$4\frac{1}{2}$ years. "I think another girl did it, huh? I think that little girl didn't make her eye. That girl's crazy."

5 years. "A man didn't make the rest of it."

(6). *Criticism of man.*

(a). *Averages.* Thirteen per cent criticize at 3 years; 21 per cent at 4 years; 16 per cent at 5 years; 11 per cent at 6 years.

3, 4, 4½ years. "A funny man."

5 years. "He had one leg before. Isn't that funny?"

6 years. "Other funny kind of neck."

(b). *Superiors.* Fifteen per cent at 3 years; 16 per cent at 2½ years; 12 per cent at 4 years; 25 per cent at 4½ years; 33 per cent at 5 years; 33 per cent at 6 years.

3 years. "That's not the way to make an arm."

3½ years. "Why has he got another leg that way?"

4 years. "Hey he hasn't got a belly-button. He has nothing on."

4½ years. "They didn't make him good."

5 years. "I can make a better arm than that."

6 years. "I don't know where his pants are."

(7). *Trends observed in superiors only.*

(a). "You do it," or similar demand occurs in 5 per cent of cases at 3½ years, in 8 per cent at 4 years.

(b). *Reference to doing the test before* occurs in 16 per cent of cases at 5 years.

(c). *Mentioning activity of the man.* Eleven per cent at 2½ years; 6 per cent at 4½ years; 8 per cent at 5 years.

3½ years. "He's going to sleep."

4½ years. "Is he laughing or what?"

5 years. "He's telling this fellow to go ahead."

G. ILLUSTRATIVE INDIVIDUAL CASES

Summaries of the Incomplete Man responses of five individual cases are presented pictorially (Figure 3). The responses of each case at yearly intervals are given, to bring out the specific kinds of changes distinctive in the development of individual children.

The drawings of Girl J.D. are depicted in Row 1, showing a constant number of parts coming increasingly into focus. The improving placement of these parts yields a progressively symmetric looking man even though the number of parts remains the same.

The responses of Girl J.V. are pictured in Row 2 of Figure 3.

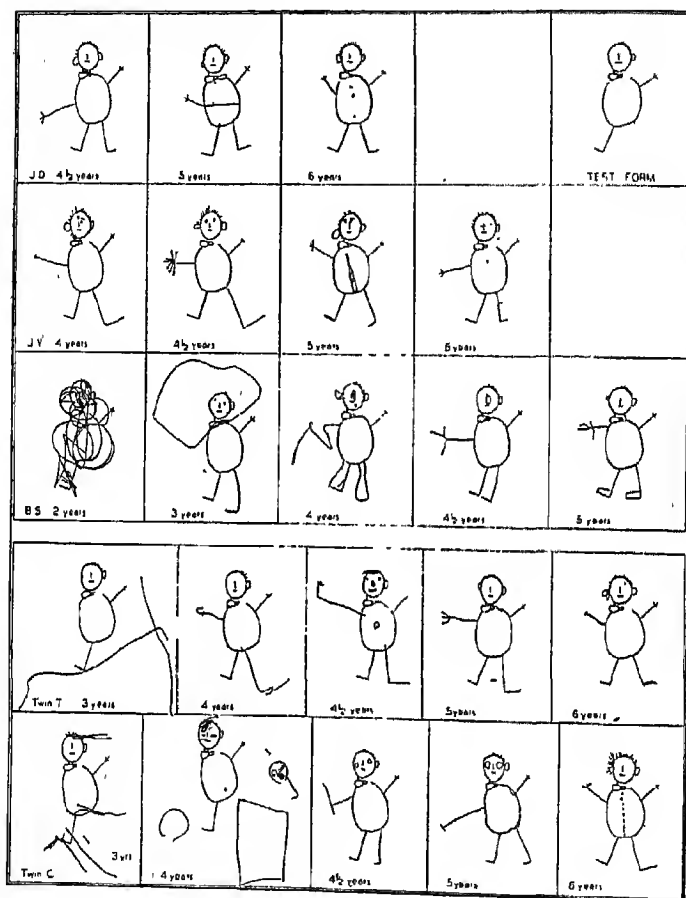


FIGURE 3
INDIVIDUAL CASES

This girl has periods of expansive and periods of depressive behavior. These mood swings are suggested in her manner of completing the man. The first and third drawings were made when she was in "expansive" moods, and show her adding more parts, in a generally more upward direction than do drawings 2 and 4. An underlying depression, however, is reflected in Drawing 3.

The responses of Girl B.S. appear in the third horizontal row of Figure 3. This child has been characterized (by Dr. Ilg) as a very dependent child given to perseverative and closing in or completing responses, and much interest in detail. Completion and closure marks will be seen to characterize each of her incomplete men. Careful attention to details also is evident.

The last two cases are identical twin girls, *T* and *C*. Brief case report of the responses of these girls is given to illustrate concretely the changes with regard to number, kind, and placement of parts. Brief personality characterizations are also given, based on a 14-year period of observation and study of the twins' behavior (Gesell

TABLE 11

<i>Number of parts</i>	
Twin <i>T</i> :	0, 0, 4, 7, 7, 6, 7
Twin <i>C</i> :	0, 0, 2, 5, 7, 10, 8
<i>Number of Accessory Marks</i>	
Twin <i>T</i> :	2, 2, 0, 2, 0, 0, 0
Twin <i>C</i> :	6, 1, 5, 0, 1, 0, 0
<i>Hair, ear, eye combinations:</i>	
Twin <i>T</i> :	hair and eyes; hair and ear; hair, ear, eyes; same.
Twin <i>C</i> :	hair and eyes; eyes; eyes; hair, ear, eyes; hair and eyes.
<i>Eyes:</i>	
Twin <i>T</i> :	Open circles; none; dots, dots.
Twin <i>C</i> :	Horizontal marks; open circles; open circles; dots; dots.
<i>Ear:</i>	
Twin <i>T</i> :	Right place, slants up; too low, slants down; too low, slants down.
Twin <i>C</i> :	Right place and slants down at the one age when added.
<i>Hair:</i>	
Twin <i>T</i> :	Horizontal hair; correct; too far around; correct.
Twin <i>C</i> :	Horizontal hair; none; none; too far around, correct.
<i>Umbilicus:</i>	
Twin <i>T</i> :	Present at 4½ years.
Twin <i>C</i> :	Present at 5 years.
<i>Arm Angle:</i>	
Twin <i>T</i> :	Up; up; nearly straight out; up.
Twin <i>C</i> :	Down; down; up; up.
<i>Leg Angle:</i>	
Twin <i>T</i> :	Too straight down throughout.
Twin <i>C</i> :	Parallels other; too straight down; correct; correct.
<i>Direction of foot.</i>	
Twin <i>T</i> :	Right; right; right; left; right.
Twin <i>C</i> :	Left; left; right; right.
<i>Verbalization:</i>	
Twin <i>T</i> :	Very stereotyped.
Twin <i>C</i> :	Very stereotyped. Pronunciation less good than <i>T</i> 's. "Dis, dat."
<i>Personality:</i>	
Twin <i>T</i> :	Direct; intent on one thing at a time. Responds to one thing

TABLE 11 (Continued)

	at a time. Focal interest. Makes a few, simple, to the point responses. Less interest in elaboration and detail, but slightly higher "intelligence" than her twin. Right handed.
<i>Twin C:</i>	Dispersive. She includes many objects and people in her responses. Great marginal interest. Interest in elaboration and detail. Perseverative. Slightly lower intelligence rating than her twin. Tendency to left-handedness.
<i>Incomplete Man Responses of the twins compared age by age (See Figure 3)</i>	
3 years.	T: 2 long marks, one horizontal, one vertical. C: 6 short marks, horizontal, through men.
3½ years.	T: 2 vertical marks, one on each side of man. C: 1 semi-circular mark, bottom of page.
4 years.	T: 4 parts. Arm and hand, leg and foot. Arm up; foot to right. C: 2 parts, horizontal hair and horizontal eyes. Five marks, 2 on man, 3 dissociated figures, the forms which she has drawn earlier in the examination (perseveration).
4½ years.	T: 7 parts including umbilicus, 2 markovers. Arm up, foot to right. C: 5 parts. Every part shows effort at symmetry.
5 years.	T: 7 parts, arm straight out, foot to right. C: 7 parts and draws around. Umbilicus. Arm down, foot to left.
6 years.	T: 6 parts. No arm; ear and foot direction show effort at symmetry. C: 10 parts, arm up, foot to right.
6½ years	T: 7 parts, symmetry correct. C: 8 parts, symmetry correct.
<i>T consistently about 6 months advanced over C in Incomplete Man performance. T tends to be slightly advanced over C in other adaptive behaviors</i>	
3 years.	C still makes an excessive number of accessory marks; T doesn't.
4 years.	T adds 2 more parts than C. C still has accessory marks; T doesn't.
4½ years.	T adds more parts including umbilicus, hair, eyes. C has no umbilicus, and eyes only. T's fingers more mature than C's.
5 years.	C now adds umbilicus. T's has gone. T has hair and eyes; C, eyes only.
6 years.	T drops off in number of parts. C is still increasing.
6½ years.	C now drops off in number of parts.

and Thompson, 5). It appears that the Incomplete Man responses of the twins nicely illustrate the major personality differences which distinguish these twins. Thus *T*, the right-handed twin, whose adaptive behavior is more direct, focalized, and slightly more advanced than that of *C*, makes fewer accessory marks, but adds more

parts to the man and adds them sooner. *C*, the left-handed and more dispersive twin, who customarily has more interest in details but gives a less advanced performance, adds more accessory marks and is slower to add parts and adds fewer. She also, as is fairly common with left-handed children up to the age of 6, draws a foot directed to the left until 6 years.

The responses of Twins *T* and *C* to the test are given in some detail to permit comparison. A tabular summary (Table 11) of their performance and characteristic behavior includes seven different ages, namely 3, 3½, 4, 4½, 5, 6, and 6½ years.

H. COMMENT AND DISCUSSION

1. *Chief Differences between the Two Groups*

As would be expected, most parts are added sooner by the superior children than by those classified as average. Superiors at each age add more parts than averages. Parts come to be of the right size, placement, and direction sooner in the superiors than in the averages. But there are other differences which may have even greater significance than these. It has been suggested (by Dr. Ilg) that the "superior" child is not only more advanced at any age level than an "average" child of the same chronological age, but that his wider horizon may result in behavior *never* exhibited by average children, no matter how old. Differences of this kind are seen in response to the Incomplete Man test situation as follows:

a. Accessory marks. In the *average* cases, accessory marks appear (at least on the surface) to be relatively superfluous or redundant, and they vary greatly from child to child, decreasing in number with age of child until they practically disappear at 5 years.

In the *superior* cases, on the other hand, accessory marks are apparently purposeful and are similar enough from case to case to be classifiable. They are present and still purposeful at 5 years. Marks are supplied to effect, in order, dissociation, closure, and finally symmetry. Average children seldom fill in the man's body; a number of superiors (about 10 per cent) do so at each age through 5 years.

b. Verbalization. Verbalization of the "superiors" is quite different from that of the "averages" in several respects. In very few

instances do the superiors merely name the man, without further verbalization; whereas this occurs to an appreciable extent in the averages. At all ages before 5 years, from two to three times as many superiors as averages comment further than mere naming, and the number of words used in description by superiors is from two to three times as many as averages.

The decrease in variety of names proceeds more rapidly in superiors; they apparently generalize sooner. By 6 years all of them call the figure a man or a boy. Averages cling to specific names as "Pied Piper," "snowman," etc.

Verbalization is better than performance in 60 per cent of the $2\frac{1}{2}$ -year-old superiors, at an age when average children are making no response to the test. Superiors tend to make varied efforts at response in the way of verbalization at an age when averages are not responding.

A number of superiors, at $3\frac{1}{2}$ years and following, say they don't know what the figure is, and then name it correctly. This behavior is practically non-existent in the averages. It suggests greater self-criticism in superiors and less readiness to hazard a guess.

At 5 and 6 years fewer of the superiors than averages continue verbalization after "What else?" and fewer add parts after prompting. It may be that superiors are more apt to say what they have to say without verbal prodding.

There is an earlier and more extensive interest of superiors in the person who drew the man.

Averages criticize by calling the man "Funny." Superiors make specific and detailed criticism.

A number of trends prominent among the superiors are not observed at all in the averages: "*You do it,*" is suggested to the examiner by superiors only. Only they mention having done the test before. Only superiors mention activity of the man. Only they boast about their own ability.

c. *Size of parts.* Development is more straight-line in averages than in superiors. That is, parts as a rule tend, in the average cases, to be too large at first, and then more and more of the right size with increasing age. In the superiors, parts are often too large, then too small, then too large again and finally of the right size

This is particularly true of ear, leg, and foot and to a lesser degree of the arm. The large numbers of superiors who make parts too small at certain ages may be due to an exaggerated effort to attain the correct size before the child is fully able to do so.

d. *Placement of parts.* Differences in this respect are not marked between the two groups. The chief difference appears to be that arm and leg are both placed incorrectly earlier and more persistently in superiors than in averages. This may be due to an exaggerated effort at correct placement.

e. *Individual differences.* As the data presented suggest, there is a certain commonplaceness and stereotypedness in the products of the average children as well as in their comments. The superiors show a much wider range both in product and in comments.

f. *Earlier and more varied performance of superiors.* As just noted, not only verbalization but addition of accessory marks is extensive in superiors at $2\frac{1}{2}$ and 3 years, when averages are not responding to the test or are just scribbling. Many personality differences in behavior occur in regard to these accessory marks (closure, dissociation, marking over) made by the superiors at these ages; differences which are never seen in averages who tend to go from scribbling, to the addition of 1 part at 3 years, and of 3 parts at 4 years.

g. *Developmental similarities.* There are a few behavioral similarities which apparently are determined by basic ontogenetic sequences, and are therefore correlated with maturity or chronological age factors rather than native ability. Although these correspondences in the average and superior groups are not striking, they are worth mentioning as follows:

(1). *Accessory marks.* Both groups draw around the man at 3 and 4 years.

(2). *Size of parts.* Arm is the right size in both groups at $4\frac{1}{2}$ years, though not earlier or later. Foot is the right size at 5 and 6 years.

(3). *Placement.* Hair goes too far around, in both groups, at 4 years. Ear is placed less accurately at 4 years than earlier or later. Leg is placed less accurately at 4 years than earlier or later. Eyes are not placed evenly, in relation to each other, until 5 years.

(4). *Angles and directions of lines.* Arm angle is downward at 4 years, straight at 5, up at 6, in both groups. Leg is at a correct angle at 4 years, but too straight down at 4½. Ear points downward in both groups at 5 years, up at 6 years.

(5). *Order.* In both groups the leg is the earliest part to be added. At all ages a majority of children of both groups (and of adults) add the leg first, as they draw.

2. *Interweaving vs. Straightline Development*

The most common, or at least the most recognized, type of development is that which may be called *straightline*. Development is straightline when a factor or function in question steadily increases or decreases with increasing age. Thus in average cases the number of parts added increases steadily as the child grows older: 1.6, 3, 6, 6.7, 8 parts. This is straightline development. The number of extra marks steadily decreases with increasing age: 1.5, 1, .3, 0 marks. This again is straightline development.

Other examples of straightline development which occur in the Incomplete Man test are as follows:

Number of cases who add leg, arm, fingers, foot, eyes, ear, neckline, neck (average cases) increases steadily.

Number of cases who add fingers, foot, hair, neckline, neck (superior cases) increases steadily.

Size of fingers, hair, ear, foot: increasing number the correct size with increasing age (average cases).

Placement of hair, averages; placement of arm and eye, superiors, increasing number correct.

Direction of arm and foot, averages; and of foot, superiors, increasing number correct.

Number who comment further than naming (both groups) increases steadily.

Number who merely scribble (both groups) steadily decreases.

Number who add marks for symmetry (superiors) increases.

Number who fill in body (superiors) decreases.

A second common kind of development has been described by Gesell (2) and is called *reciprocal interweaving*. This differs from straightline development in that a factor in question does not steadily increase or decrease with age, but may fluctuate in dominance and

may alternately increase and decrease; or it may disappear and then reappear, but in a more complex and advanced form. Placement of the arm, by the superior group, is a simple example of interweaving. At 3 years the arm slants upward, though too far up. At $3\frac{1}{2}$ and 4 years it slants downward. At $4\frac{1}{2}$ and 5 years it extends straight out. At 6 years it once more slants upward, though this time at a more accurate angle than when it first slanted upward at 3 years. Leg angle in both groups also illustrates this type of development. In the average cases from 4 to 6 years the leg slants correctly, then too straight down, then correctly, and once more too straight down. Naming the man also illustrates interweaving. Both groups, though at different ages, name the man, in age sequence: a man, a girl, a man, and finally a boy. It should be noted that the occurrence of interweaving or fluctuation in Incomplete Man responses is not based on statistical averages alone, but on the repeated evidence of individual cases. There is considerable interweaving in regard to size of parts.

a. *Size of ear, superiors*: too large at $2\frac{1}{2}$; too small at 3; too large from $3\frac{1}{2}$ to $4\frac{1}{2}$; 36 per cent each too large and too small at 5 years; 40 per cent too large and correct at 6 years. Size of feet shows the same trend.

b. *Length of arm, both groups*.

(1). *Superiors*. Too long $2\frac{1}{2}$ to 4 years; 42 per cent each too long and correct at $4\frac{1}{2}$ years; too long at 5 and 6 years.

(2). *Averages*. Too long at 4 years; 50 per cent each too long and correct at $4\frac{1}{2}$; too long at 5 and 6 years.

c. *Length of leg, average*. Too large; correct; too large; correct; at increasing age levels.

Interweaving occurs in placement of parts as follows:

d. *Placement of eye, ear, and arm and leg, averages*. The arm for instance, is placed correctly at 3 years; too low at 4 and $4\frac{1}{2}$; correctly at 5 and 6 years.

e. *Placement of eye, ear, leg, in superiors*.

f. *Presence of eye, ear, and hair, superiors*. The number of superior cases who add eyes and ear and hair also illustrates interweaving. Eyes are strong at $2\frac{1}{2}$ years, scarce at 3 and $3\frac{1}{2}$; predominant thereafter. An ear appears at $2\frac{1}{2}$ years; drops out at

3; reappears at 4 years and thereafter. Of the three face parts (eyes, ear, hair) eyes and ear both appear at $2\frac{1}{2}$ years; none appear predominantly at 3 years; hair or ear but no combination of any two is seen at $3\frac{1}{2}$ years; any one of the three is seen at 4 years; any of the three, or eyes and ear both appear at $4\frac{1}{2}$; all three appear together at 5 years and thereafter.

The number of superiors who add accessory marks as well as the number of marks added illustrate interweaving; decreasing till 5 years and then increasing.

The number of words occurring in verbalization accompanying drawing increases till 5 years in averages, till $4\frac{1}{2}$ years in superiors, and then decreases.

3. Correspondence between Ontogenetic Order and Order of Execution in the Adding of New Parts

There is considerable variation from child to child (and from adult to adult) in the order in which parts are drawn in a single session. But the most common order is as given in Table 12.

TABLE 12

Order of drawing (within a single session), averages:

4 years.	Leg, foot, arm, hand (33% start with leg).
$4\frac{1}{2}$ years.	Leg, foot, arm, hand, eyes, umbilicus.
5 years.	Leg, foot, arm, hand, eyes, hair, ear (64% start with leg).
6 years.	Leg, foot, arm, hand, eyes, hair, neckline, ear (66% start with leg).

Order of drawing (within a single session), superiors

$2\frac{1}{2}$ years.	Eyes, umbilicus, ear, arm, leg (66% start with eyes).
3 years.	Leg, foot, arm, hand, eyes, umbilicus (50% start with leg).
$3\frac{1}{2}$ years.	Leg, foot, arm, hand (38% start with leg).
4 years.	Leg, foot, arm, hand, eye, hair, ear, neckline (56% start with leg).
$4\frac{1}{2}$ years.	Leg, foot, arm, hand, ear, eyes, hair, neckline (great variety here; 36% start with leg).
5 years.	Leg, foot, arm, hand, ear, eyes, hair, neckline, neck or buttons (50% start with leg).
6 years.	Leg, foot, arm, hand, ear, eyes, hair, neckline, buttons. Or, arm, hand, leg, foot, eyes, hair, ear, neckline, buttons (40% start with leg; 60% start with arm).

Order of drawing (within a single session), adults

Most common order is: leg, foot, arm, hand, tie, neck, eyes, hair, ear. Sixty per cent of adults start with the leg. By sexes, 90% of the men, and 40% of the women start with the leg.

This order of drawing parts appears to be, in general and rather roughly, duplicated by the ontogenetic order of adding new parts. Thus for the two groups, the order of adding new parts appears to be as follows: (a) *Developmental order in Averages*: Leg, foot, arm, hand, umbilicus, hair, ear, neckline, eyes, neck. (b) *Developmental order in Superiors*: Leg, arm, foot, hand, eyes, ear, hair, neckline.

In averages, though not in superiors, the leg (in individual cases) attains the correct size sooner than the arm. In both groups leg is placed correctly before arm. And in both groups leg is added at an accurate angle before the arm. This agrees with the ontogenetic order of appearance of these parts, leg being added first. Study of the tables will indicate in what order other parts attain correct size, placement, and angulation.

4. *Coming Into Focus*

As pointed out in the age summaries of 5- and 6-year-old behavior, the child as he matures appears to come into focus with respect to his Incomplete Man behavior. He draws fewer accessory marks, fewer disconnected marks; parts become shorter, more accurately placed and at more accurate angles. Hairs are fewer, eyes are smaller. Eyes, ear, and hair all three occur at the same age. Verbalization decreases and is more to the point.

The group, as well as the individual child, also appears to come into focus. The group itself narrows down in the variety of responses—behavior becomes more similar from child to child. Naming of the man is a case in point. At 3 years children name the man a boy, a man, a girl, some kind of animal, a snowman, and a variety of other names. At 6 years, only man and boy are mentioned. By 6 years many trends have reached their peak and declined to zero, so that fewer items are required to describe behavior of the whole group at 6 years than at earlier ages.

A careful study of the several trends involved as Incomplete Man responses improve and the drawing becomes more symmetric, complete, and focalized, suggests the inadequacy of a behavior rating based only on the number of parts added to the man. An adequate appraisal of any child's Incomplete Man behavior should include,

besides counting of parts added, consideration of at least: (a) What parts are added as well as their number; (b) number and kind of accessory marks; (c) placement of parts, their angle and direction; (d) size of parts; (e) kind and size of eyes and their relation to each other; (f) presence or absence of umbilicus; (g) amount and kind of verbalization.

Thus a superior 6-year-old man which had 9 parts added, but whose leg is too near other and too long, whose arm is placed too low and points downward, whose eyes are open circles and unevenly placed, and whose ear is too low and whose hair too far around, must be considered to rate more nearly at a 4- than at a 6-year-level, in spite of the 9 parts added.

Not only should such specific qualitative considerations be considered in rating a child's Incomplete Man behavior, but also it is important to consider any individual child's performance *in terms of his own past performance*. Although averaging the number of parts added at any one age, by the group, slightly obscures the trend, summaries of individual cases illustrate the fact that in any individual case (superior group) the number of parts added by any one child tends to increase through 5 years and then at 6 years to decrease.

Thus a child may at 6 years add only 8 parts because he has not yet, in his experience, reached the 5-year norm of 9 parts, or because he has already reached and passed it. Again, a child of 5 may add an arm at a correct angle having already gone through the stages of adding it at a downward angle and then straight out; or he may not yet even have reached the stage of adding it at a downward angle.

Thus as in many behavior fields, in accordance with the principle of reciprocal interweaving, the rating of a given behavior may depend to some extent on what stages a child has already gone through, and on whether he is on his way up to or down from a certain peak of achievement and interest.

This reaching a peak and subsequent decline with satiety occurs in many behaviors. Ling observes it in visual fixation as early as 24 weeks (6) with the human infant, who having already reached a stage of accurate fixation, arrives by 24 weeks at the stage of post-perfect fixation, during which he fixates less well than earlier. It

is important to keep this fact in mind when appraising the behavior of infants and children, and to avoid attempts to judge behavior development by means of tasks which no longer have optimum interest for the child.

I. Summary

1. The responses of 241 children between the ages of $2\frac{1}{2}$ and 6 years to the Gesell *Incomplete Man Test* were analyzed. Half the children were of "average" intelligence (DQ range 90-110); half, of "superior" intelligence (DQ range 120 and above). The responses of a supplementary group of 25 adults were also considered.

2. Responses were analyzed with regard to number and kind of parts added to the man; order of adding parts; size, angle, placement and direction of parts added. Associated behaviors, as accessory markings, and verbalization which accompanied performance, were also considered.

3. Although the two groups, i.e., "average" and "superior" children, have many behavior trends in common, the typical genetic gradations of behavior for the two groups appear to be somewhat distinctive for each. *Genetic gradations* for the two groups separately (illustrated in Figure 2) are as follows:

Average Cases

a. Scribbling over man (3 years).

b. Addition of a long leg and arm, carelessly placed, often crossing body line. Arm is placed too low and slants downward. Foot, which may be merely an extension of the leg, points left (4 years).

c. Addition of leg, foot, arm, hand, umbilicus, eyes. Arm slants downward but foot turns right. Leg is short, arm still too long. Eyes are open circles unevenly placed ($4\frac{1}{2}$ years).

d. Addition of leg, foot, arm, hand, eyes, ear, hair. Arm points straight out, foot to right. Arm and leg may be too long. Eyes are filled in. Hair is too long but in right place (5 years).

e. Addition of leg, foot, arm, hand, eyes, hair, ear and neckline. Arm points up, foot to right. Leg and hair are of right length, arm too long. Eyes are filled in. Man appears neater (6 years).

Superior Cases

- a. Scribbling over man ($2\frac{1}{2}$ years).
 - b. Addition of arm and leg, too long and carelessly placed (3 years).
 - c. Addition of leg, foot, arm, hand and ear. Arm and leg are too long. Arm points down, foot to right ($3\frac{1}{2}$ years).
 - d. Addition of leg, foot, arm, hand, eyes, ear. Arm and leg are too long, arm points down. Eyes are open circles (4 years).
 - e. Addition of 7 of the following parts: leg, foot, arm, hand, eyes, ear, hair, neckline. Arm and leg are too long, arm points straight out. Eyes may be open or closed ($4\frac{1}{2}$ years).
 - f. Addition of leg, foot, arm, hand, eyes, ear, hair, neckline and neck or buttons, and one extra mark, often to make leg bilateral. Leg is right size, arm still too long and points straight out. Eyes are filled in. Hair right size and place. Buttons are open circles (5 years).
 - g. Addition of same parts as above, but arm points up, hair is shorter, buttons are filled in. Man looks neater and more symmetric (6 years).
 - h. Addition of 10 parts: leg, foot, arm, hand, eyes, hair; ear, neckline, neck and tie. Man appears to be very symmetric (adult).
4. *Added parts* were observed to increase, as child grew older, in resemblance to parts already present, with respect to size, placement, and angle. Development is discussed for these three trends separately as well as by members. Development toward symmetry, summarized by individual members, takes place as follows:
- Hair* recedes, becomes fewer in number of strokes, and shorter.
- Eyes* become smaller and more filled in, more even in size, and more evenly placed with respect to each other and to nose.
- Ear* moves up, becomes smaller and more circular, and ceases to overlap the headline.
- Arm* moves upward; slants down, then straight out, then up; and becomes shorter.
- Fingers* are first a circle, then an extension of the arm, then at right angles to arm, and finally three lines at a correct angle. They gradually shorten.

Umbilicus comes in from $2\frac{1}{2}$ to $4\frac{1}{2}$ (in averages mostly at $4\frac{1}{2}$) and then drops out.

Buttons become smaller and more filled in.

Leg placement and angle are fairly good throughout. *Leg* becomes shorter.

Foot turns from left to right and becomes gradually shorter.

5. *Accessory marks.* The number of cases who add extra marks and the number of marks added decreases for both groups with age, though the superiors again add extra marks at 5 years. Marks added by average cases vary considerably from child to child and are difficult to classify. Marks added by superiors appear more purposeful and have the following age sequence:

$2\frac{1}{2}$ years.	Scribbling or controlled marking on man
3 years.	Dissociated marks or enclosure of man.
$3\frac{1}{2}$ years.	Encircling of man, closure of parts, and close connection of all marks to man.
$4\frac{1}{2}$ years.	Few extra marks.
5 years	Marks added for symmetry.

6. *Verbalization.* The average number of words accompanying drawing increases till $4\frac{1}{2}$ to 5 years then decreases. Average cases may merely name the man, superiors usually verbalize further and more elaborately. The figure is named, with increasing age of subject: a man, a girl, a man, a boy.

7. Pictorial summaries of the Incomplete Man behavior of five individual cases illustrate the manner in which a standard behavior situation brings out consistent and characteristic differences in personality. They also serve to illustrate some of the major trends in Incomplete Man behavior as they occur in individual cases.

8. A detailed comparison of the behavior of the "average" and "superior" groups showed that the groups differed markedly in many ways other than the mere number of parts added. The superior child appears to be not only more advanced at any age level than an "average" child of the same age level, but his wider horizon appears to result in some behaviors never exhibited by "average" children no matter how old. This occurs especially with regard to accessory markings and verbalization. However, certain responses appear in-

capable of transcending chronological age and appear at certain age levels regardless of the developmental rating of the child.

9. Two common types of development, both illustrated in Incomplete Man behavior, are described and examples of both are given: (a) Straightline development, in which a factor in question steadily increases or decreases with increasing age; (b) Interweaving development, in which a factor in question alternately increases and decreases, or disappears and then reappears in a more complex or well-developed form.

10. It is pointed out that the order of adding parts within a single session appears to be, rather roughly, duplicated by the ontogenetic order of adding new parts. This order, for the two groups separately, is as follows: *Averages*: leg, foot, arm, hand, umbilicus, hair, ear, neckline, eyes, neck. *Superiors*: leg, arm, foot, hand, eyes, ear, hair, neckline.

11. The inadequacy of a behavior rating depending only on number of parts added is suggested as well as the importance of considering a child's performance in terms of his own past performance.

J. SUPPLEMENTARY NOTE*

1. Age Summaries

a. $5\frac{1}{2}$ years (9 cases). All add parts; only three add an accessory mark (a second man drawn beneath the model, a mark over nose and mouth, and a two-dimensional leg). Average number of parts is 8+. Parts most commonly added are: Eyes, ear, hair, neck, neckline, arm, hand, leg, foot. Leg may be placed correctly or too far to the right, too short; and foot turns right. Arm is placed too low, is too long or of right length, and turns upward. Eyes may be either open circles or filled-in dots.

b. 6 years (26 cases). All add parts; none, extra marks. Average number of parts is 9; parts added being the same as at $5\frac{1}{2}$ years. Buttons also may be added, an average of five filled-in dots. Leg is placed correctly, of right length, and turns right. Arm is

*Since completion of this manuscript, additional cases have become available for the age levels $5\frac{1}{2}$ years, 6 years, 7 years. A brief analysis of their responses is given here. All of these cases are children in the "superior" category.

placed correctly, of right length and points up. Eyes are filled-in dots, or open circles with pupils (34 per cent; the peak age among children for this item).

c. 7 years (11 cases). All add parts; two mark over nose and mouth. Average number of parts added is 9 to 10; parts being eyes, hair, ears, neck, neckline, tie, arm, hand, leg, and foot. Arm and leg are of right length and are placed correctly; arm points up, foot to right. Eyes are filled-in dots or open circles with pupils.

d. Adults (25 cases). All add parts; one marks over nose and mouth. Average number of parts added is ten: eyes, eyebrows, ear, hair, neck, tie, arm, hand, leg and foot. Arm and leg are placed correctly and are of right length; arm points up, foot to right. Tie and neck are present instead of tie, neck and neckline as at 7 years. Eyes are mostly open circles with pupils and eyebrows. Only 20 per cent add clothes, 24 per cent add buttons.

2. Summary of Trends by Parts

The chief changes from 5 years on are in the kind of eyes; and in the neck, tie, neckline combinations.

Thus *eyes*, which at $4\frac{1}{2}$ years were half open circles, half filled-in dots, become filled-in dots from 5 through 7 years. Pupils begin at 6 years (34 per cent), but do not become predominant till adult drawings. Neither brows nor lashes are prominent till adulthood, when brows occur in 52 per cent of the cases.

Neckline only occurs at 5 years; *neck plus neckline* at $5\frac{1}{2}$ and 6 years; *neck, neckline and tie, or tie only*, at 7 years. Adults add *neck and tie*.

Sex parts do not occur conspicuously at these ages.

Buttons (an average of 5 filled-in dots) occur in 30 per cent of 6-year olds; (an average of 5 small circles) in 24 per cent of adults.

As to *arm and leg*, the summaries from $2\frac{1}{2}$ years on are given.

Leg: Placement. Too near other leg from $2\frac{1}{2}$ to $4\frac{1}{2}$ years; half too near and half correct at 5 years; half too far and half correct at $5\frac{1}{2}$; correct from 6 years on.

Length. Too long from $2\frac{1}{2}$ to $4\frac{1}{2}$ years; correct at 5 years; too short at $5\frac{1}{2}$; correct from 6 years on.

Direction of foot. About one-third of cases from $5\frac{1}{2}$ through

7 years draw the foot to the left; others, to the right. At these ages the majority who draw foot to left are left-handed though that is not invariably the case.

Arm: Placement. Half too high, half too low at $2\frac{1}{2}$ years; too low from 3 through $5\frac{1}{2}$ years; correct at 6 years and after.

Length. Too long from $2\frac{1}{2}$ to 4 years; half too long and half correct at $4\frac{1}{2}$; too long at 5 years; half too long and half correct at $5\frac{1}{2}$; correct at 6 years and after.

Direction. Arm points up in more than half the cases at $5\frac{1}{2}$ years and in a marked majority from 6 years and after; 35 per cent have arm pointing straight out at $5\frac{1}{2}$ years.

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THE VINELAND SOCIAL MATURITY SCALE AND SOME OF ITS CORRELATES*

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Since its publication in 1935, the *Vineland Social Maturity Scale* (5, 6, 7) has come into wide use. Numerous studies reporting its use with various groups of children have appeared, and Doll (9) has recently published an annotated bibliography of published and unpublished studies. Most of this work is concerned with the re-

TABLE 1
DISTRIBUTION OF RAW SCORES ON THE VINELAND SOCIAL MATURITY SCALE
(ONE EXAMINER)

Age (mos.)	No. cases	Mean	Sigma
6	8	8.69	1.21
12	17	17.44	2.28
18	18	30.81	3.40
24	15	37.37	2.28
30	17	44.24	1.89
36	12	48.00	2.42
42	16	51.03	2.49
48	10	55.10	2.53
54	13	57.54	2.27
60	12	59.00	2.55
66	15	61.80	2.46
72	9	64.11	2.05
78	9	65.61	3.12
84	21	68.33	3.22
90	11	71.59	3.25
96	7	74.21	2.86
102	10	75.80	2.76
108	14	77.61	2.49
114	8	79.31	1.40
120	11	79.36	1.92
Total	253		

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Figure 1 shows the distribution of the 253 tests (two examiners) based on interviews with the mother, with Doll's average score for each age ($SQ = 100$) plotted for comparison. Doll has not yet published the detailed statistics for his standardization group. It will be noted that although the present group of normal children is consistently superior in social maturity, the curve closely parallels that of Doll. This superiority in social maturity is consistent with the general superiority of the sample in other characteristics such as intelligence, as may be seen in Table 2.

TABLE 2
MEANS AND STANDARD DEVIATIONS OF *CA*, *MA*, *SA*, *IQ*, AND *SQ* FOR THREE GROUPS DIVIDED ACCORDING TO INTELLIGENCE TEST USED

Variable	<i>n</i> = 91		<i>n</i> = 35		<i>n</i> = 35	
	Stanford-Binet Mean	Sigma	Merrill-Palmer Mean	Sigma	Gesell Mean	Sigma
Chronological age	71.91	29.73	37.26	7.63	18.17	5.83
Mental age	85.20	35.40	43.40	12.97	20.80	7.69
Social age	81.47	30.92	46.14	10.43	21.29	7.84
<i>IQ</i>	118.90	14.43	116.47	15.14	114.47	15.89
<i>SQ</i>	115.57	11.71	123.71	12.91	115.46	16.40

A. RELIABILITY

Doll (9) gives a correlation of .92 as an indication of the reliability of the scale, which represents the mean of correlations obtained by various comparisons, including reexamination by the same examiner with different informants, a different examiner with the same informants, etc., on 123 subjects; the intervals between tests varied from one day to nine months. The subjects were feeble-minded residents at the Training School.

Several measures of the reliability of the present group of tests are available. The following tabulation presents the test-retest correlations at various intervals (Table 3).

TABLE 3

Interval (Months)	No. Cases	<i>r</i>
6	51	.66
9 (mean)	31	.63
12	31	.42

A group of 19 children received three consecutive tests at intervals of six months. Test 1 correlated with Test 2 .41, Test 1 with Test

3 .34, and Test 2 with Test 3 .87. These correlations are lower the longer the interval between tests, which is usual. They indicate that the later tests are more reliable than the earlier ones, which is logical if only because increased familiarity with the instrument and the informants should yield more reliable results. In general, the test-retest correlations are not greatly different from those obtained with intelligence tests used under similar conditions.

Forty-five children $6\frac{1}{2}$ to 10 years of age were tested with the child as informant by a different examiner. Of these, 32 were tested by the writer with the mother as informant within six months of the test using the child as informant. Social quotients for this group correlated .50.

Thirty-six children were tested by a different examiner using the mother as informant. Of these cases 20 were tested six months previously by the writer.² The correlation between social quotients was .85.

These correlations indicate a satisfactory reliability for the scale when used by a skilled examiner with informants with whom he is acquainted and who in turn are acquainted with the subjects. In such circumstances the main source of unreliability, other than the scale itself, is probably the source of information. Actual changes due to longitudinal development, and possibly seasonal fluctuations (due to the nature of some of the items), also tend to lower test-retest correlations.

B. VALIDITY

Doll (6) presents as evidence of validity the progressive order of difficulty of the items, which is according to him remarkably consistent. In addition he correlated the estimated social ages of feeble-minded subjects with social-age scores on the scale, obtaining correlations ranging from .73 to .97. These are probably spurious to some extent, since the influence of chronological age is not eliminated (Doll does not give the age range).

No outside criterion of social maturity is available with which to validate the scale. However, in a sense, the correlation of one variable with any other variable is an estimate of the validity of

²Six of these cases were identical with those in the group using the child as informant; the rank order correlation for this small group is .60.

each, since the size of the correlation is in part a measure of the extent to which they overlap or measure the same thing. Defining validity in this broad sense, the remainder of this report deals with various aspects of the validity of the scale.

1. *Relation to Chronological Age*

Since the basis of standardization of the scale, like other developmental scales, is chronological age, the correlation of scores with chronological age should be an indication of the validity of the scale. Doll apparently accepts this criterion when he uses the progressive order of difficulty of the items and median age scores in standardizing the scale and as evidence of validity (6). However, he appears to be inconsistent in his position when he states that "there is no dependence of social score on life age except where life age is accompanied by genetic maturation." Neither Doll³ nor Bradway (3) report the correlations with chronological, or life, age, though they are presumably low, in view of Doll's (6) partial correlation of .30 between social age and life age, holding mental age constant, and since partialing out life age by Bradway (3) did not reduce the correlation with mental age ($r_{MASA}=.73$, $r_{MASA.CA}=.72$). Doll concludes on the basis of this correlation that the scale measures a genetic or maturation factor (related to mental age) rather than an experiential or training factor (related to chronological or life age). This may be true of his feeble-minded subjects, but is inconsistent with the method of standardization of the scale; mental age itself is related to chronological age. Moreover, the separation of a genetic and experience factor is a theoretical abstraction not justified on the basis of the data which he presents. The lack of correlation between life age and mental age and life age and social age in Doll's subjects is explainable on the basis of the fact that they were all feeble-minded and socially immature (2), that is, the range of social and mental ages was presumably small. Bradway's subjects, on the other hand, represent a narrow age distribution, which would account for a low correlation with life age.

The correlations with chronological age in the present group are

³However, in an earlier study (8) Doll does report an r of .91, based on 54 normal subjects, and .13 for 223 mentally deficient subjects.

high. For three sub-groups, divided according to type of mental test used, the correlations are .97 (group having Stanford-Binet test, 91 cases); .89 (group having the Merrill-Palmer test, 35 cases); and .93 (group tested with Gesell scale, 35 cases). The mean chronological ages, together with the standard deviations, are given in Table 2. Partialing out mental age, these correlations become .71, .57, and .58, which are considerably higher than Doll's .30. Also, partialing out chronological age from the correlations between social age and mental age reduces the correlations much more (from .96, .88, and .92 to .53, .52, and .44 respectively), than in Bradway's group, indicating that chronological age is influential in determining social age. These correlations are evidence that, using chronological age as a criterion of maturity, the scale is a valid measure of one aspect, presumably social, of this maturity, although it overlaps considerably with mental maturity. They lend no basis to an attempt to separate genetic and training factors in social maturity.

2. *Relation to Intelligence*

Various studies have been concerned with the relationship between social maturity and intelligence (1, 3, 6, 8, 10, 12, 13). Doll (6) reports a correlation of .80 between social age and mental age. He does not report the correlation between social quotient and intelligence quotient in this study, although in another place (8) he reports a correlation of .81 on feeble-minded subjects. Bradway (3) found a correlation of .73 between mental age and social age in a group of grade school children. She does not report the correlation between *IQ* and *SQ*. Hayden (10) and Melcher (13), in unpublished studies, found low correlations (.16 to .39) between intelligence quotients and social quotients; the former found a correlation of .46 between mental age and social age in a group of 29 children in an orphan institution, and .65 for a group of children in their own homes.

In the present study the correlations with intelligence varied with the test used. The correlation with Stanford-Binet *IQ* ($n=91$) is .41, with Merrill-Palmer scores .38 ($n=35$), and with Gesell scores .61 ($n=35$). These correlations are relatively low. That the correlation with the Gesell test is highest is logical, since the items at that lower end of the Vineland scale are similar to those in

the Gesell test. The correlations of social age with mental age are .96, .88, and .92 for the three tests, respectively. Mean mental ages and standard deviations are given in Table 2. These are higher than the correlations reported by Doll and Bradway. Social age thus has more in common with mental age in the present group than in their groups, but this correlation is due to the influence of chronological age, as indicated in the preceding section, since when chronological age is partialled out the correlations between social age and mental age are reduced considerably, and when mental age is partialled out of the correlations between social age and chronological age the correlations, while reduced, are still quite high. Since both scales (social and intelligence) are based on chronological age in standardization, this is logical.

3. *Relation to Child Behavior and Personality*

The *Joel Behavior Maturity Scale* (11) purports to measure the "grownup-ness" of young children by means of a series of ratings on such behavior as dressing, washing, toileting, and social position in the group. The items are thus in part similar to those included in the *Vineland Social Maturity Scale* at this age level. Thirty-nine of the present group of children were rated on a shortened form of this scale (14), by three raters in consultation after one month's observation in the nursery school. The ratings were made within four months of the time the social quotient was obtained. The mean age of the children at the time the behavior quotients were obtained was 44.13 months, with a standard deviation of 13.49 months; the mean age at the time the social quotients were obtained was 44.33 months, with a standard deviation of 13.30 months. The coefficient of correlation between the *BQ* (Behavior Quotient) and *SQ* for this group was .45. Correcting for attenuation (assuming reliabilities of .80 for the Joel and the Vineland), the coefficient becomes .56. This correction does not eliminate the factor of unreliability in the informant which enters into the Vineland scores. If all mothers overestimated (or underestimated) the child equally, the correlation would not be affected, but this is hardly likely to be the case. The mean social quotient for this group is 119.56, while the mean behavior quotient is 106.41 (Table 2), which might result from a general tendency to overestimate on the part of the mothers. In

any event, the correlation is high enough to demonstrate a certain validity for both measures at this age level. Whether the variable sampled is "social," or "behavior" maturity, or something else, is not of concern here.

In addition to the ratings on Behavior Maturity, ratings on other aspects of the child's behavior in the nursery school are made through the use of a series of 30 ratings scales (16). Ratings are based on a month's observation in the nursery school; the means of three raters are used. The ratings on 43 children were correlated with their social quotients obtained within six months of the time the ratings were made. These correlations are reported in Table 4.

TABLE 4
CORRELATIONS OF SOCIAL QUOTIENT AND RATINGS OF CHILD BEHAVIOR IN THE
NURSERY SCHOOL ($n = 43$)

Scale	r
Affection	.28
Aggressiveness	.21
Cheerfulness	.09
Competitiveness	.12
Conformity	-.27
Cruelty	.06
Curiosity	.18
Emotional Control	-.23
Emotional Excitability	.23
Fancifulness	.15
Frequency of Gross Activity	.33
Friendliness	.18
Gregariousness	.04
Intensity of Emotional Response	.22
Jealousy	.08
Kindness	-.04
Leadership	.20
Obedience	-.28
Originality	.07
Quarrelsomeness	.15
Physical Apprehensiveness	-.30
Sensitiveness	.07
Sense of Humor	.18
Suggestiveness	-.16
Tenacity	.03
Patience	-.29
Planfulness	-.07
Resistance	.31
Vigor of Activity	.35
Social Apprehensiveness	-.23

Standard Error for an r of .00 = .15.

None of the correlations is high, but those which are largest present an interesting pattern. The correlations above .20 give a picture of an active, non-conforming, resistant, emotional, aggressive child who is at the same time affectionate. This grouping is similar to an antagonism or aggression factor which emerged in the factorial study of the scales (15), with the exception that it includes affectionateness and does not include the elements of hostility which form a part of the aggression factor. The socially mature child thus appears to be active, independent or even resistant, which is not inconsistent with Doll's definition of social maturity (7) as "the extent to which the person progressively dominates his environment and creates, demands, or justifies his own freedom of action as age increases." "Sociability" does not seem to be a part of this trait, since gregariousness, friendliness, kindness, leadership, and sensitiveness are not included in the group of variables correlating highest with the scale.

This evidence, together with the high correlation with the Gesell scale and the moderate correlation with the Joël scale, seems to indicate that the Vineland at this age level at any rate, is measuring a trait of independence in motor ability manifested in self-help characteristics. The nature of the items in the scale at this level is in line with this statement. Social characteristics in the ordinary sense of the word seem to enter but little into this configuration, at least at the age level studied here.

4. *Environment and Social Maturity*

Doll (6) believes that the scale is not dependent upon the environment, finding no correlation between social maturity scores and cultural status or length of time in the institution in his population of feeble-minded subjects. Since the education and intelligence of the parents, and the income of the family, are indices of the socioeconomic environment, these variables were correlated with the social quotients of the children included in this study. The results indicate no great relationship. The correlations with intelligence (Otis) are .15 ($n=79$) and .29 ($n=62$) for the mothers and fathers respectively; with education they are .28 ($n=83$) and .39 ($n=82$) respectively; the correlation with income is .09 ($n=79$).

The personality of the parents may be considered a part of the child's environment. Correlations between the personality of the

mother as measured by the Bernreuter *Personality Inventory* (2) and the child's social maturity were therefore obtained. The correlation with neuroticism is $-.21$, with self-sufficiency $.00$, with introversion $-.19$, with dominance $.30$, with confidence $.22$, with sociability $.09$ ($n=80$). There is some slight tendency for children of dominant, self-sufficient, non-neurotic and extroverted mothers to be more socially mature.

A further measure of the environment was available for the present group, consisting of ratings of the mothers on 30 variables of parent-child behavior (4), made by a visitor to the home. The correlations between these scales and the social quotients of the children are given in Table 5. Here again none of the correlations is sig-

TABLE 5
CORRELATIONS OF SOCIAL QUOTIENT AND RATINGS ON PARENT-CHILD
BEHAVIOR OF MOTHERS

N	Scale	r
60	Adjustment of home	.13
60	Activeness of home	.03
60	Discord in home	-.12
60	Sociability of family	.22
60	Coordination of household	.24
60	Child-centeredness of home	-.01
60	Duration of contact	-.12
60	Intensity of contact	-.12
60	Restrictiveness of regulations	-.26
59	Readiness of enforcement	.04
56	Severity of actual penalties	-.04
51	Justification of policy	.21
44	Democracy of policy	.28
60	Clarity of policy	.13
60	Effectiveness of policy	.06
60	Disciplinary friction	-.09
59	Readiness of suggestion	-.19
59	Coerciveness of suggestion	-.12
59	Accelerational attempt	.08
60	General babying	-.04
60	General protectiveness	-.00
60	Readiness of criticism	-.07
60	Favorableness of criticism	.06
43	Readiness of explanation	.23
60	Solicitousness for welfare	.04
60	Acceptance of child	.11
60	Understanding	.11
60	Emotionality toward child	-.02
60	Affectionateness toward child	-.00
60	Rapport with child	.04

Standard Error for an r of $.00 = .14$ to $.15$.

nificant. Those correlations which are highest suggest that the child who is socially mature tends to come from a home which is sociable, coordinated, not too restrictive, having a democratic disciplinary policy which is justified to the child, and in which the mother tends to be ready to explain things to the child. This picture of freedom is consistent, and in agreement with the type of child behavior found to be associated with social maturity in the preceding section. However, since the correlations are so low, little confidence can be placed in the interpretation.

C. SUMMARY AND CONCLUSIONS

The present paper is a report of the use of the *Vineland Social Maturity Scale* with a group of normal children from 6 months to 10 years of age. The scale was found to be a fairly reliable instrument in the hands of a competent examiner, though a source of unreliability still remaining is the informant, as indicated by the relatively low correlation between scores obtained using the mother and the child as informants.

Evidence concerning the validity of the scale is presented in the form of correlations with other aspects of the child's behavior and personality. Correlations with chronological age are high, and correlations with mental age are also high, while the correlations with *IQ* are relatively low, from which it is concluded that the scale measures an aspect of maturity, presumably social, which overlaps with mental maturity through the common influence of chronological age, yet is not identical with intelligence. The correlation with the *Joël Behavior Maturity Scale* is moderate. Correlations with the child's behavior as measured by ratings in the nursery school are lower, but present an intelligible picture of the socially mature child as active, non-conforming, resistant, disobedient, emotional—in short, independent and rather aggressive. Sociability as commonly understood does not enter into this picture.

The relationship of the social quotient to the environmental factors employed in this study is not significant, save possibly the finding that social maturity is positively correlated (.39) with the education of the father. The lack of correlation with the specific environmental variables included in this study does not necessarily mean, as Doll (6) declares, that social maturity is not affected by

the environment; on the contrary, the correlation with life age indicates that insofar as life age is accompanied by experience and training social maturity is influenced by the environment. At any rate it seems to be impossible to separate the genetic maturation factor from the training factor, as Doll attempts to do, and to conclude that social maturity is primarily a genetic characteristic.

The *Vineland Social Maturity Scale* thus appears to be a reliable and fairly valid measure of an aspect of development which, at the age level studied, might be called independence (in self-help), or self-sufficiency, the child who is socially mature being independent and self-sufficient as indicated by his ability to care for himself in necessary routine matters.

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A STUDY OF HUMAN AVERSIONS AND SATISFAC-
TIONS, AND THEIR RELATION TO AGE,
SEX, AND TEMPERAMENT*

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A. INTRODUCTION

Measurement of aversions, wants, satisfactions, desires, and drives has in the past been restricted almost exclusively to the study of animals. Warden (4), Moss (3), Warner (5-7), and others carried out such measurements by observing the number and strength of electric shocks which an animal would be ready to suffer in order to achieve various instinctive satisfactions. While a similar procedure in the case of human subjects is not entirely ruled out, the difficulties in carrying out experiments of this kind have so far proved too great to be overcome, and it was found necessary to devise different methods. Two such methods have been suggested by Thorndike (8). In one experiment he asked his subjects for how long they would be ready to undergo incarceration in prison in order to win certain satisfactions, such as having a new Cadillac car, or a year's cruise round the world. In another study, he asked his subjects how much money they would demand in order to undergo certain discomforts, or suffer certain mutilations and deprivations, such as becoming unable to smell or taste, or eating a dead earthworm, six inches long. The philosophical difficulties arising in such an attempt to measure what many philosophers have declared to be incommensurable are dealt with by Thorndike in a later publication (9), and need not detain us here. Taking it for granted that the aim is not an illusory one, nor one incapable of being reached, we may ask if the methods used by Thorndike are the most likely to achieve the desired results, and if there may not be other methods better adapted to our purpose. In particular, it appears

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possible that the methods of direct comparison (ranking, paired comparison, etc.), which have proved so valuable in the study of aesthetic preferences, jobs liked and disliked, etc., might with advantage be used here also.

The methods of direct comparison would seem to have the following advantages over Thorndike's procedure. In the first place, the necessary effort of the imagination is reduced to a minimum. By requiring the subject to say which he would prefer, a new Cadillac or a world cruise, you make it necessary for him to imagine these two "satisfiers," while by asking him how long he would spend in prison in order to be given either, you give him the additional task of imagining various lengths of prison sentences, a task likely to be even more difficult than the original one because he may be presumed to have more familiarity with cars and cruises than with periods in prison.

In the second place, Thorndike's measuring rod does not remain identical from person to person, a fact which makes it hazardous to use averages or other statistical covenants in connection with his data. People's ideas about how much money they would require in order to undergo certain deprivations are certainly conditioned by their actual circumstances, and likely to vary widely in consequence; yet their actual estimates of the degree of aversion associated with each proposition may be identical. This difficulty does not arise when the method of direct comparison is used.

In the third place, the actual judgments are often devoid of real meaning. Young recipients of relief demanded 100,000 dollars as recompense for eating a dead earthworm, a sum which quite obviously bears no relation at all to that with which they would have been content if an offer were seriously made. By being required to compare directly various such "annoyers" the subject is forced to think more realistically.

It might be replied that while Thorndike's method may be subject to certain disadvantages, these are more than counterbalanced by the fact that he does provide, in rough and ready form, a scale of measurement in terms of which aversions and satisfactions can be measured, while the method of direct comparison cannot produce a scale of that type. Such an objection, however, would seem to

be unfounded; there is no difficulty in producing a scale of measurement in terms of the thing to be measured. If we can measure goodness of handwriting, or of composition, by referring each item to be judged to a scale of standardized examples, there seems to be no valid reason why it should not be possible to refer each aversion or satisfaction to be judged to a scale of standardized aversions or satisfactions. Two such scales, of a provisional nature,

TABLE 1

No.	Aversion	Average ranking	SD
1.	To become totally blind	8.8	1.58
5.	To have your intelligence reduced to below average	8.5	1.64
13.	Never again to read another book or periodical	7.1	1.58
9.	To hear no more music for the rest of your life	6.3	1.90
14.	To be shunned by your friends and acquaintances without being able to find out the reason	5.8	1.76
8.	To have to go to bed at 6 every night, and get up at 2 in the morning, for the rest of your life.	5.4	1.70
2.	To become totally bald.	5.4	2.32
16.	To live in close contact with uncongenial people for a year	5.2	1.67
17.	To work under someone who constantly criticizes you	5.2	1.82
20.	To cut a pig's throat with a knife	5.2	2.47
25.	Never to have a child of your own, nor adopt one	5.1	3.08
23.	Not to be allowed to listen to news-broadcasts or read papers and weeklies	5.1	1.95
7.	To live quite alone for a year friendless in a strange town	5.0	1.67
10.	To have all your teeth extracted	4.9	2.07
19.	To have one finger cut off under an anaesthetic	4.8	1.95
21.	Never to see another work of art, i.e., another statue or picture	4.7	2.00
4.	To get up in the middle of Sunday service at St. Paul's and run down the aisle shouting: "The day has come, the day has come!"	4.5	2.32
11.	To become incapable of taking part in any athletic pastimes, such as dancing, riding, tennis	4.1	2.32
15.	Never to see another film	4.0	1.90
22.	To be barred from ever owning, feeding, or playing with animals	3.8	1.79
12.	To give up any social affairs involving more than four people	3.7	1.58
6.	To be rationed for food as at present (Winter, 1940-1941) for the rest of your life	3.4	1.64
3.	To have to live for the rest of your life outside the British Isles	3.2	1.76
24.	To have the three main meals under communal feeding arrangements	3.0	1.67
18.	To get a job which involves making many speeches	2.8	1.79

TABLE 2

No.	Satisfactions	Average ranking	SD.
24.	To have a loving (and loved) companion for life, who shares your responsibilities	8.5	1.84
8.	To possess every book you would like	7.1	1.73
19.	To have your work praised and acknowledged	6.9	1.48
17.	To write a successful book, play, or monograph	6.7	1.52
13.	To be a forceful talker, both in private and in public	6.6	1.38
22.	To be able not to worry, even when there is good cause	6.0	2.02
21.	To have complete security in your job (or your husband's)	5.9	2.14
10.	To meet people and go places	5.8	2.12
15.	To be admired by your crowd	5.7	1.67
16.	To have a brilliant child	5.5	2.41
6.	To be allowed to write the leader in a national newspaper	5.4	2.05
5.	To have a free pass to all London theatres	5.3	1.10
18.	To be a famous pianist	4.9	2.10
2.	To have your choice of any picture in the world	4.8	1.45
1.	To live in perpetual sunshine	4.7	2.00
20.	To believe in a life after death	4.6	2.77
11.	To know Latin and Greek perfectly	4.4	2.53
3.	To be able to quote Shakespeare at every fitting occasion	4.0	1.41
9.	To be tennis champion	3.7	1.52
12.	To be an expert ballroom dancer	3.7	1.61
25.	To be assured of living till you are very old	3.6	2.45
4.	To have a talk with the King, Stalin, or Roosevelt	3.5	1.67
7.	To have an inexhaustible supply of smokes	3.0	2.49
14.	To be allowed to read all the books banned for indecency	2.6	2.07
23.	To have an unlimited supply of your favorite drinks	2.3	1.41

are provided below, Tables 1 and 2. (These scales could easily be improved upon, by eliminating items with high Standard Errors, and substituting items with low Standard Errors instead.) On the whole, then, it would appear that the use of the method of direct comparison would bring with it certain advantages, and in the following sections an attempt is made to apply this method to human aversions and satisfactions, and to discover their relation to such factors as age, sex, and temperament.

B. DESCRIPTION OF EXPERIMENT

The test used consisted of one series of 25 aversions, and another series of 25 satisfactions. The 50 propositions were typed on separate slips of paper, numbered A1 to A25 for the aversions, and B1 to B25 for the satisfactions. The actual propositions used, to-

gether with their numbers, are given below, Tables 1 and 2, arranged in order of dislike (aversions) and preference (satisfactions). Some of these propositions are taken directly from Thorndike's paper; the rest were selected by the writer from a large number suggested by friends and colleagues.

Each of the subjects taking part in the experiment was asked to rank these propositions in order of preference (for the satisfactions) or of dislikes (for the aversions), using the following scheme of grouping, according to which the most liked (or most disliked) proposition receives 10 points, and the least liked (or disliked) proposition receives 0 points.

<i>Points given</i>	10	9	8	7	6	5	4	3	2	1	0
<i>Number of propositions</i>	1	1	2	3	3	5	3	3	2	1	1

Subjects were requested to judge each proposition on its own merits, without taking into account consequences, such as spending the night in prison after running down St. Paul's Cathedral shouting: "The day has come," or being able to sell the picture they liked best. Subjects were also asked to state age, sex, and profession; in addition, a test of temperament was given which will be described below.

Twenty-eight subjects took part in the experiment, 14 men and 14 women.¹ Their average age was 30, the oldest being 40 and the youngest 20. Professions given were: Teachers, 6; Students, 5; Technicians and Engineers, 5; Housewives, 3; Psychologists, 3; Office Workers, 2; Commercial Artist, 1; Journalist, 1; Minister, 1; Industrial Worker, 1.

C. RESULTS

The average rankings of the two sets of 25 propositions are given in Tables 1 and 2, together with the Standard Errors of the averages. The averages vary from 8.8 to 2.8 for the Aversions, and from 8.5 to 2.3 for the Satisfactions; the *SE*'s average respectively 1.92 and 1.88 for the two groups, varying between 1.58 and 3.08 for the Aversions, and between 1.38 and 2.77 for the Satisfactions. The average intercorrelation of the Aversion rankings was .37;

¹My thanks are due to Dr. P. E. Vernon for his kindness in giving this test to a number of Scottish subjects. All other subjects were English

that of the Satisfaction rankings was .33. We can deduce from these figures to what extent the average judgment would agree with the "true order" of the whole population only a sample of which has been tested. For the Aversions, this correlation is .97; for the Satisfactions, it is .96. These values are high enough to give us a good deal of confidence in the validity of the averages as reported (1).

Unweighted factor saturations for the 28 subjects were obtained by correlating each person's order with the average order. These correlations average .61 in the case of the Aversions, and .56 in the case of the Satisfactions. In view of previous results in the field of preference rankings (2), it might have been expected that those who were found to be highly saturated with the general factor in one test would also be highly saturated with the general factor in the other test. This is not the case, however; the correlation between the two series of saturations is $-.16$. It would appear, if we may argue from this solitary result, that different factors enter into our judgments of aversions and satisfactions respectively. From introspective comments, it seems that in many subjects the Aversions test called forth far stronger emotional responses than the Satisfactions test; it is possible that we have here the reason for the negative correlation reported above.

Of equal interest with the study of the factors of agreement between the subjects is the study of the causes for disagreement. We can answer the questions arising in that sphere to some extent by first preparing a table of deviations of the individual scores in each of the two tests from the average scores, then summing separately the deviations for various opposing groups, such as males and females, or introverts and extraverts. High deviations in the averages between the two opposing groups may then reasonably be attributed to the dichotomy under consideration, i.e., sex or temperament in our example. When this procedure is followed, the following differences are observed.

1. *Male-Female*

Women are more averse than men to cutting a pig's throat, and to never seeing another work of art; they also have a greater aversion to becoming totally bald. Men in comparison are more averse to

going to bed early, and to becoming incapable of carrying on with athletics; on the other hand men would like to have a *brilliant* child more than women. There is a suggestion that men would like more than women to live until they were very old, and that women would like to know Latin and Greek more than men would, but these two last are not statistically significant. The correlation between the average rankings of men and women is .86 for the satisfactions, and .75 for the aversions.

2. *Old-Young*

The old prefer an inexhaustible supply of smokes, complete security in their jobs, and the ability not to worry as compared to the young. The young, on the other hand, value having a talk with the King, Stalin, or Roosevelt, and being admired by their crowd more highly. The young are more adverse to not being able to take part in athletics, while the old object particularly to communal feeding, being barred from owning animals, never seeing another work of art, and cutting a pig's throat.

3. *Introvert-Extravert*²

Introverts would like particularly to own every book they cared

²The test used in this connection requires a word of explanation. The subjects were asked to rank in order of applicability to themselves 25 personality traits taken from Guilford's study of personality factors *S*, *E*, and *M* (cf. *J. of Psychol.*, 1936, 2, 109-127). This ranking was carried out in accordance with the grouping scheme given above. Scores for each subject were obtained by multiplying the position given to each trait by the factor saturation of that trait for Introversion, and for the three personality factors. Thus each person's ranking was given marks with respect to four different factors, producing in this way four scores for each person.

The factor saturations were derived from an analysis of the inter-correlations between the traits reported by Guilford. (My thanks are due to Professor Guilford for his kindness in sending me his original correlations.) My reasons for not using the saturations given by Guilford in his own analysis can be found in my review of Thurstone's "Primary Mental Abilities" (*Brit. J. Educ. Psychol.*, 1939, 9, 270-275); in the main, it is contended that by refusing to acknowledge the existence of a "general factor" of intellectual ability in the case of Thurstone, or of temperamental qualities in the case of Guilford, these authors do violence to the facts and lose the most valuable information the table of intercorrelations has to give. In the particular case of the analysis reported by Guilford, he denies the existence of any general Introversion factor; by using Burt's "group factor method" on his data, I found a general Introversion factor which

for, while extraverts would like to read books banned for indecency, have a brilliant child, and be forceful talkers. Introverts would hate particularly to live with uncongenial people, get a job which involved making speeches, and work under someone who criticized them constantly. Extraverts would hate particularly to become bald, and possibly to become totally blind, to be rationed as at present, and to have their teeth extracted. These last three are not statistically significant, nor are two further differences suggesting that introverts would hate cutting a pig's throat more than extraverts would, or being shunned by their friends.

4. *Sociable-Unsociable (Personality Factor S)*

The sociable subjects would like particularly to live till very old, to be admired by their crowd, to have a loving and loved companion, and possibly to have a brilliant child. The unsociable would like to know Latin and Greek. As regards the aversions, the sociable would hate particularly to become totally bald, and to have all their teeth extracted. The unsociable would dislike to get a job involving making speeches, and possibly being kept from listening to broadcasts and reading the papers.

5. *Emotionally Dependent-Independent (Personality Factor E)*

The emotionally dependent would like particularly a perpetual supply of smokes, and the capacity not to worry; the emotionally independent want to live till very old, read indecent books, be forceful talkers, and tennis champions. The emotionally dependent would hate particularly to cut a pig's throat, to have no child of their own, or to have a finger cut off; the emotionally independent would hate to be incapable of taking part in athletic pastimes.

accounted for 9.5 per cent of the variance, in addition to three group factors, identical with *S*, *E*, and *M* factors found by Guilford, which accounted respectively for 3.9 per cent, 6.4 per cent, and 3.5 per cent of the variance.

The advantages of this "group factor method" are obvious; with the Spearman school we discover a general factor, and with the Thurstone-Guilford school, we discover a series of group factors, thus reconciling these two otherwise incompatible schools, and extracting a maximum amount of information from our data. (Cf. C. Burt, *The Factors of the Mind*, 1940.)

6. *Aggressively Masculine-Nonaggressive (Personality Factor M)*

The masculine desire particularly to be tennis champions; the non-masculine long for perpetual sunshine. The masculine hate particularly the thought of giving up athletic pastimes and going to bed early; the non-masculine hate most not to have a child of their own, and to run down St. Paul's shouting: "*The day has come.*"⁸

D. DISCUSSION AND CONCLUSIONS

The results reported in the previous section show, I think, that the method of direct comparison may with advantage be used in the study of aversions and satisfactions. Indeed, it might be maintained that investigations of this kind have certain latent possibilities which further research will undoubtedly reveal more clearly. Thus in the first place, data of the kind presented here may be used for discovering national, racial, sexual, and class differences which have hitherto proved difficult to investigate.

Secondly, apart from such group factors, the general factor itself presents an interesting field of study, hardly more than tapped by the present research. It might even be suggested that methods of this kind may be helpful in determining government action under certain circumstances. For instance, the data reported show that rationing did not involve any great hardship at the time of writing, seeing that our subjects were more upset at the thought of being barred from playing with animals than at having to live on present rations for the rest of their lives. Gallup surveys bear out this finding. The comparatively low *SE* suggests that this is true more or less universally. Similarly, it is often suggested that the "English character" would not stand for the introduction of communal feeding, but would insist on the "sanctity of the home." Our figures do not bear this out; almost universally, there seems to be little

⁸It will be noted that the aversions and satisfactions of the emotionally dependent and the non-masculine, and the masculine and the independent, are very much alike. It is possible that we are here dealing with a single continuum, not with two. This suggestion is supported by a factor-analysis of correlations between rankings of traits by 16 subjects, in which the first factor to appear was a bipolar factor opposing the emotionally dependent and the masculine aggressive. This factor contributed 30 per cent to the variance. (A second factor, opposing the sociable and the non-sociable, contributed 11 per cent.)

opposition to the idea of having all one's meals under communal feeding arrangements (except among the old, who might require special persuasion). The great success of such arrangements (particularly among the young) has since confirmed this result.

It is not of course suggested that government policy should be decided by small-scale experiments of this kind; the point is that the method can easily be used for experiments on a larger scale. On the other hand, it would be a mistake to think that the numbers of observers needed would be very great; as shown above, the average ranking of our 28 observers would correlate very highly with the "true order." (In order to take care of group factors, it might be necessary to undertake preliminary analyses, or even to treat different classes or regional groups separately; this, however, would not affect the fundamental *rationale* of our method.) Apart from the two instances cited above, in which independent facts were shown to corroborate our findings, there are several others which might be corroborated in a similar way. The great amount of aversion to being prevented from ever hearing any music again might surprise those who believe that few people appreciate music; the recent triumphal success of the London Philharmonic Orchestra's effort to "bring music to the people" would seem to show that the place of this item in our average ranking is fully justified. The high degree of aversion to living with uncongenial people might have served as a warning to evacuation officials, who did not give much attention to this aspect of their problem; this neglect caused a good deal of the trouble which ensued.

In the third instance, our findings seem to indicate a rather novel method of studying temperamental differences. Instead of asking our subjects, for instance, whether they are sociable, or whether they are inclined to worry, we might just note how highly they placed such items as "being able not to worry, even when there is good cause," or "having to give up social intercourse with more than four people at a time" in our list of satisfactions and aversions. Such an oblique attack might circumvent such difficulties as the halo effect, or the desire to give a good impression, and be more revealing therefore than the more usual methods. This might be particularly true of children, who might be induced to do a test of this kind as a sort of game.

Such developments, however, lie in the future. For the moment, we may draw the following conclusions from our data:

1. Human aversions and satisfactions can be fruitfully studied by means of the method of direct comparison.
2. Agreement on the propositions used is comparatively high, the intercorrelations averaging .35.
3. The average rankings agree with the "true order" to the extent of .97 and .96.
4. High agreement with the average judgment in one test is not correlated with high agreement with the average judgment in the other test.
5. Individual differences in the rankings of aversions and satisfactions are found to be correlated with differences in age, sex, and temperament.
6. Several of the findings of this research were corroborated by reference to independent facts.

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SOME CHARACTERISTICS OF VERY SUPERIOR CHILDREN*

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Popular opinion has long held the very superior individual to be some kind of freak, a very different and queer person who is likely to come to no good end, who can probably only look to a rather futile future at best. Psychologists have shown this popular belief to be erroneous, as they have done with so many popular ideas, but they have raised the question whether or not it is possible that very superior children may be too bright for their own good. The late Leta Stetter Hollingworth was quoted in the press on several occasions as having stated that the most desirable level of intelligence probably lies between *IQ*'s 125 and 145, that if one could choose his child's level of ability he should choose within this range since the best adjustment, educational, personal, and social, appears to be made by children whose ability falls within this range and since those who possess intelligence quotients above the level may be so bright, may be so superior, and thus different from the children with whom they must associate in school and on the playground, that adjustment may be very difficult in the ordinary school and social situation.

Dr. Hollingworth (1 and 2) also expressed the belief in various articles that the adjustment of superior children becomes increasingly difficult as the *IQ*'s rise above 150. This study is concerned with very superior children and endeavors to throw some light upon the educational and personality adjustments of children of varying degrees of superiority with the hope of determining, in some measure, whether or not adjustments do become increasingly difficult as the *IQ* rises above 145 or 150.

Coördinated Studies in Education, Incorporated,¹ was able to

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¹The writer wishes to acknowledge his indebtedness to the Advisory Committee of Coördinated Studies in Education, Incorporated, for the privilege of using the data presented in this study.

collect a large amount of data on some 45,000 elementary school children in grades four to eight, inclusive. These children were found in 455 schools and 310 communities in 36 states. The children included in this survey were given the Kuhlmann-Anderson Test and these test results were made the basis of selection for the subjects included in this study. Two methods of selection were used. For some phases of this study all those who obtained an *IQ* rating of 145 or more were selected and they are compared with those whose *IQ* ratings were between 125 and 144 in order to determine whether those of the latter group were making superior adjustments to those of the most superior group at the time the tests were given. The second method of selection used was to choose the 10 with the highest intelligence quotients in each grade since the intelligence quotients did not run as high in some grades as in others, indicating, perhaps, that the Kuhlmann-Anderson Tests are not of equal difficulty at all grade levels.

The writer feels that he is justified in stating that the children included in these two groups possess very superior ability since each child represents approximately one in a thousand in ability as measured by the Kuhlmann-Anderson Test. The purpose of this study is to investigate the home backgrounds and the personal and educational adjustments of these very superior children within the limits of the data available.

The methods of selection used in setting up the groups of superior children which have been publicized the most extensively in the literature have been such that some have expressed the opinion, which many have accepted almost without question, that superior children come from quite superior socio-economic levels. A socio-economic rating scale was set up for the purpose of investigating the origins of the very superior children included in this study. The socio-economic rating scale used takes account of the father's occupation, the presence in the home of a telephone, auto, radio, regular servant, and newspaper, and the room-per-person ratio. This scale gives a possible range of ratings from 0 to 18. The teachers also gave the home an economic rating of inferior, average, or superior—inferior to represent the lowest quarter and superior to represent the top quarter of the community economically.

The homes from which these very superior children come, that is, the children with *IQ* ratings of 145 and over, obtained ratings from 2 to 15, with a median rating of 8. The teachers were unable to give a rating relative to the economic status of many of the homes but 37 of the homes were rated. Seven were rated inferior, 27 average, and only four superior. This means that only four of the homes from which these very superior children came were judged to be on a par with the upper fourth of the community economically, whereas seven were rated as falling in the lower fourth economically, with approximately 70 per cent representing the middle half of the community economically. This means that some of the children come from homes where poverty is present, some from homes which are characterized by abundance, while the majority come from a wide range of middle class homes.

The highly significant finding, though, is that these very superior children can be expected in practically any type of home, as far as socio-economic rating is concerned. It is true that they tend to come from homes which have average ratings slightly higher than the average of the total population surveyed, but this fact can easily be over-emphasized and misinterpreted. It must be recognized that averages may be very misleading and that one gets an incorrect picture of the origins of these very superior children if emphasis is placed upon the average. The important finding is that these children can be expected in all kinds of homes, that the distribution of very superior ability is such that it might be termed a highly democratic distribution.

It is interesting to note that the median socio-economic rating for the group of superior children whose intelligence quotients range from 125 to 144 is slightly higher than that of the very superior group, 8.5 as compared with 8.0. Throughout this study the number of subjects, 930 for the 125 to 144 group and 50 for the very superior group, is too small to give statistically reliable results. For this reason, the writer does not believe that one is justified in interpreting the above results as indicating that the very superior group comes from homes which are inferior to those of the 125 to 144 group, but it does seem evident that they do not come from superior homes. The superiority of the homes of both of these groups is not

very great when compared with the median rating for the entire population surveyed, which is 6.61.

The occupations of the fathers of the 10 children with highest intelligence quotients in each grade were listed. This listing, which is given in Table 1, emphasizes the fact that very superior ability may be expected in all types of homes.

TABLE 1

<i>Professional group—5</i>	<i>Skilled labor—16</i>
High school principal	Farmer—6
Captain—United States Army	Barber
Doctor	Printer
Minister	Mechanic—3
Designer	Mason
	Mail carrier
<i>Business and Managerial group</i>	Plumber
<i>—18</i>	Sign painter
Merchant—2	Sergeant in army
Salesman—5	
Fruit broker	<i>Semi-skilled and unskilled labor</i>
Grocer—2	<i>—12</i>
Pharmacist	Road work—2
Jeweler	Mill hand—2
Security exchange commission	Miner
Aviator	Logger—2
Clerk	Truck driver
Insurance	Common laborer—2
Postmaster	Factory worker—2
Assistant superintendent of railroad	

One child was in an orphanage, and no information was available relative to the father, and the father of another child was an inmate of a state mental hospital.

A survey of the interests of this group of very superior children, as revealed by participation in the extra-curricular activities of the school and by their hobbies, gives no evidence of abnormality of interests for the group as a whole. They have, as a group, more extensive interests than average children and their interests in music and reading are very definitely superior to those of the total population surveyed. Three out of every five of these very superior children are designated as being interested in music, which is far greater than the interest of any other group in music. Equally significant is the fact that they have quite normal interests in all types of sports and games. The most significant finding here, was

believe, is that the interests of this group of very superior children are quite normal in every sense of the term.

Most of the children included in this study were given the *BPC Personal Inventory* and the scores obtained indicate that, as a group, their adjustment, as measured by this Inventory, is superior to that of any other group of children included in this survey. Their median score was 23.6, as compared with 27.8 for the group whose intelligence quotients lie between 125 and 144, 28.5 for the entire upper 10 per cent of this population, and 35 for an unselected group. This would appear to indicate that this very superior group has achieved a type of emotional stability, as revealed by this Inventory, which is quite superior to that of the other groups.

The entire population included in this study was rated on the basis of a list of 70 personality traits. It was suggested to those doing the rating that they pick out not less than five or more than 12 traits which they deemed to be most characteristic of each child to be rated. These personality ratings indicate that, on the whole, these very superior children have achieved personalities which are far superior to those of average children, or even to those of the upper 10 per cent. The data appear to justify a statement to the effect that very superior children, at least those included in this study, have superior personalities.

The characteristic which appears to differentiate this very superior group most definitely is *adventuresome*. One in three of these children is rated as being adventuresome whereas only one in 6.5 of the upper 10 per cent, and one in 10 of the total population surveyed are so characterized. Other personality characteristics which the teachers who did the rating believed to be particularly characteristic of this group are ambitious, dependable, energetic, friendly, happy, honest, investigative, leader, likes jokes, original, polite, and tidy.

Most individuals who have given any thought to the matter will concede that the very superior child, as judged by intelligence tests, is the most promising material which comes to the schools. It is important, therefore, to note any information, available in the data at hand, relative to the adjustment of the very superior children to the school situation which they must face. It would appear, off-

hand, that any teacher should recognize as possessing exceptional ability a child who rates one in a thousand on an intelligence test. It certainly is not to be expected that any of these would be rated as dull or mentally sluggish. Neither of these expectations is realized, if we are to judge by the ratings made by the teachers.

Only one boy in five and two girls in five are characterized as being *precocious* or *mentally quick*. It must be recalled that these children rate as one in a thousand on tested mental ability. When children of such unusual ability do not stand out in the ordinary classroom one would appear to be justified in assuming that the school is failing to challenge the child of exceptional ability. It is to be noted that this is even more the case with the boys than with the girls. It is equally significant to note that two of this group have been designated as *dull* or *mentally sluggish* by their teachers. While this is not a large percentage, it is hardly to be expected that teachers would so designate such brilliant children. The fact that a higher percentage of the group whose intelligence quotients are above 144 are so designated than of those with intelligence quotients between 125 and 144 might be interpreted as indicating some greater maladjustment relative to the school situation for the very superior group, but the subjects are too few to justify anything more than a hazardous guess since it may be wholly a chance distribution. There is nothing in these characterizations, however, to indicate that the schools are doing much for these very exceptional children.

There is some evidence that those with the highest intelligence quotients are somewhat more maladjusted than those who are slightly below them in intelligence. Of the 10 children who attained intelligence quotients of 160 or more, seven appear to be somewhat maladjusted as far as personality traits or educational achievement are concerned. On the basis of personality traits which are assigned to them by their teachers, six of the 10 appear to be suffering from personality maladjustments. That is, they are listed by their teachers as possessing several traits which mental hygienists rate as undesirable. The traits referred to here are "goody-goody," cute, destructive, domineering, day-dreaming, cruel, immature, nervous, over-sensitive about self, over-critical of others, too easily frightened, stubborn, inattentive in class, slovenly, suggestible, quarrelsome,

lack of interest in work, pouting, unhappy, moody, or depressed, and self-conscious. If only one of these traits was ascribed to a child it was not considered to be particularly significant. The child was only considered maladjusted when the teacher believed that several of these traits were characteristic of the child. The Personal Inventory only indicated maladjustment in about a third of these cases and it should be noted that whenever the Inventory indicated maladjustment the teachers' ratings also indicated maladjustment. This would appear to indicate that the Inventory is not sensitive enough to detect maladjustment in all cases. A seventh of the 10 children mentioned above appears to have had a well-adjusted personality but was quite retarded educationally. That is, the educational age achieved on a battery achievement test fell below the mental age as indicated by the intelligence test. Twelve children obtained intelligence quotients between 150 and 160, and there is evidence of maladjustment in the case of only two of these.

Few of these very superior children who are maladjusted give evidence of aggressive behavior. Rather, they are characterized by behavior of the withdrawing or egocentric type. The characteristics most frequently attributed to them, as noted above, are day dreaming, nervous, moody, depressed, unhappy, over-sensitive about self, over-critical of others, suggestible, inattentive in class, lazy, self-conscious.

Unfavorable living conditions appear to react very powerfully, and even disastrously, upon these very superior children. Ten of the 50 were shown as having come from homes of poverty. All except one of the 10 appear to show the effects of this type of background and that one is well-adjusted both personally and educationally. A second appears to have a well-adjusted personality but the educational age is four years below the mental age. Three appear to have personality maladjustments but are educationally adjusted, while seven are maladjusted both personally and educationally. The average retardation of those who are educationally maladjusted is 29.5 months.

Those with intelligence quotients above 145 show more educational maladjustment than those with intelligence quotients from 125 to 144. Sixty-four and five-tenths per cent of the former have

educational ages which are below their mental ages whereas only 52.5 per cent of the latter have educational ages below their mental ages.

Decile scores were available for each grade of the total population on reading, geography, arithmetic problems, and language usage, the scores having been obtained from the *Unit Scales of Attainment Battery* which was administered to all of the children. In order to determine how these very superior children were achieving relative to the entire population surveyed, their scores were scattered in the various deciles in which they fell. No consideration is given here to the fact that these children, if working up to ability, should obtain scores which would fall in the extreme upper ranges of the highest decile since they are one in a thousand in ability. Rather they are treated as if they were one in 10 in ability.

It is striking, indeed, that so many of these very able children are doing so little in the way of achievement. As usual, they are doing better in reading than in other subjects, which again emphasizes that reading is more closely dependent upon intelligence than the other school subjects. It would appear to be a severe indictment of our present set up in the elementary school that less than half of these exceedingly able students, if we are to trust our measure of intelligence and achievement, are obtaining achievement scores which fall in the top decile and it is an even more severe indictment that so many of them are so low in achievement that they earn scores which fall in the lowest five deciles. The comparisons shown in Table 2 indicate that the highest group, those with *IQ*'s of 145 or more, are

TABLE 2
A COMPARISON OF THE PERCENTAGES OF CHILDREN WITH *IQ*'s ABOVE 144 AND THOSE WITH *IQ*'s FROM 125 TO 144 WHOSE SCORES ON DESIGNATED ACHIEVEMENT TESTS FELL IN VARIOUS DECILES AS SHOWN

	Tenth deciles		Ninth and tenth deciles		Lowest five deciles	
	<i>IQ</i> 125-144	<i>IQ</i> 145 Up	<i>IQ</i> 125-144	<i>IQ</i> 145 Up	<i>IQ</i> 125-144	<i>IQ</i> 145 Up
Reading	40.2	46.7	56.2	63.9	14.5	9.6
Geography	32.9	42.0	49.6	51.7	15.6	19.3
Arithmetic problem	33.8	42.8	52.4	52.3	17.2	22.3
Language usage	34.5	35.0	50.2	49.2	19.7	19.0

achieving very little more than those with quotients from 125-144, in spite of their superior ability. It is evident from Table 2 that as large a percentage, except for reading, of the latter group obtain scores falling within the two highest deciles as there are of the former group.

The latter part of this study has stressed the maladjustments of the very superior group. Too much emphasis can be placed on this aspect of the study and there is a danger that the reader will conclude that these children represent a badly adjusted group. The writer believes, after a careful study of all cases, that the only conclusion which can be arrived at is that, as a group, they are by no means as badly adjusted as some previous studies might lead us to believe. Many, in fact the majority, have made excellent adjustments. The data at hand indicate, we believe, that the majority are very normal children making normal adjustments and there is no evidence here that abnormality or queerness is the typical characteristic. There is maladjustment to be sure, but it does appear to be evident that their very superior ability has enabled them to adjust, in the majority of cases, to an educational system which we know neglects them. When maladjustment is present, especially in the very superior group, it indicates great social waste, and there is maladjustment. This maladjustment appears to be slightly more prevalent in the very superior group as might well be anticipated. All of this calls for a readjustment of our elementary educational program in order to serve more adequately the most promising material which comes to our schools.

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SEX DIFFERENCES IN CHILDREN'S ATTITUDES TO PARENTS*

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Do boys and girls differ in their fundamental attitudes toward their parents? Do they differ in what they think about their parents? What is the nature of these differences? How do they differ in their feeling reactions? For example, are the characteristic reactions of boys more or less pleasant, unpleasant, or indifferent than those of girls? How do they differ in form of emotional expression? Which sex manifests more ambivalence? Which more guilt, shame, remorse? Which more acceptance, respect, or admiration? What style of expressiveness characterizes their reactions? To what extent do they think of their parents as being God-substitutes, judges, companions? To what extent do they think of them in terms of blind-love, reciprocal love, pride? These, in general terms, are the problems explored in this study.

A. THE PROBLEM OF SEX DIFFERENCES

The traditional outlook assumes the existence of sex differences. Some of the attitudes expressed in the literature on the subject are the direct or indirect, witting or unwitting, effects of anticipatory reactions which fit in with traditional assumptions. They are not, as some investigators as well as journalists have concluded, marks of innate differences. Well to remember in this connection, therefore, are the general conclusions expressed by Miles and Terman (15). In 1929 these investigators, after sifting all the data concerning sex differences in association of ideas as revealed by the usual word association technique, came to the conclusion "that statements with reference to sex differences observed in casually selected groups are likely to be quite misleading, and that results and conclusions are important only in terms of the conditions." Relevant also for

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this study is their summary statement of sex differences reported and their explanation of these.

The cumulative evidence indicates that the groups of women who have been compared with the groups of men show a slightly more introverted, subjective, evaluating type of response. This would be expected from any group, without regard to sex, that had been subject to the somewhat more personalized and limited life experience of these women as compared with the men. The extent, value, normality of interest, and the form in which it is expressed do not vary for the sexes appreciably except as they are conditioned by the character of the interest expressed.

In accord with these conclusions are the findings reported by the present writer in two previous studies of sex differences. In a study of differences in the forgetting of pleasant and unpleasant experiences (11) more women were found to have a greater tendency to forget the unpleasant, to be memory-optimists, than men. This tendency was interpreted as a regulative response in the adjustment processes of individuals studied. Women's somewhat richer memory-experiences as well as tendency to forget more unpleasant experiences were thus interpreted as being related to their lack of opportunities for experiencing. That is to say, for their relatively fewer outlets they compensated by more frequently remembering, or reliving in memory, previous pleasant experiences. Similar in nature could be the explanation for the findings in the study of sex differences in knowledge of psychology before and after the first course (12). Women in this study were found to gain more though they knew no more at the beginning. In the nature of the subject matter of psychology as well as differences which exist on campuses in activities that are open to the sexes is found the explanation for the findings. Again we find differences in regulative processes of adjustment in response to differences in psychological and social aspects of situational realities. Similar in nature are the general conclusions expressed in a recent evaluation of researches in sex differences (1, 8, and 16).¹

Common sense would suggest that the influences of anticipatory

¹The literature for as well as the findings on differences in parental preference patterns are reported in a separate publication (13).

behavior patterns are even more likely to be found in children's attitudes to parents than in studies previously mentioned. Because of this fact it becomes even more important that the nature of the subjects and the method used in evoking responses from them as well as the general situational conditions be kept in mind in interpreting the meaning and significance of the present study.

B. THE PRESENT STUDY

The present study, therefore, represents an attempt to obtain facts concerning the parental attitudes of an adequate sampling of comparable boys and girls by a method that evokes responses which though unrestrained and spontaneous are susceptible to quantitative treatment. The selection of both method and subjects was made with this purpose in mind.

In our search for a method of discovering the real attitudes of children to parents we surveyed the works of such investigators as Piaget (18¹) and Isaacs (3) as well as the techniques developed in child guidance work. Our aim, like that of Piaget in his investigations of children and Mayo (7) in his investigation of workers, was "not in getting the subject to answer questions but in inducing him to talk freely and to display his spontaneous tendencies in place of cramping them within imposed limits." For this reason we rapidly eliminated the testing approach in spite of its statistical advantages. Free conversation and observational methods not being applicable for a study of our specific problem, the conclusion to use some personal interview method was rapidly arrived at.² Convinced by Rademacher's comprehensive evaluation (19) as well as by clinical experiences of the limitations of a single interview we sought for more indirect methods.

The method selected for use in this study may be referred to as the Single Free Association Interview. The constants and variables in the interviewing process with each child are indicated in brief in the following description of the method: All the interviewing was done in selected schools. Each child was individually interviewed in

²The advantages of the personal interview method of studies of the nature of this one are discussed in some detail in (14, p. 18) and (20, chapter XII).

a special room assigned by the principal of each school for the purpose. A preliminary conversation with each child was carried on to sense likely responsive or resistive attitudes. The child was advised that if he did as told he would get some fun out of the game to be played and spend but a few minutes doing it. He was then given instructions for "loud thinking" about a given word or idea and asked to speak out ("shoot out") the first 10 ideas that came to his mind when he thought of the given word or words. He was assured that there were no right answers and that his responses would not be reported to principal, teacher, mother, or other such persons. Frequently used words for such practice purposes were: table, school, ball park, Washington, Lincoln, Roosevelt. The children were further advised not to hold back because what they thought of was silly. The idea was, they were told, just to speak out without any reservation (any holding back) the first 10 ideas. When the interviewer considered the child relaxed, and the child by his responses indicated that he understood the directions, he was asked to give the first 10 ideas that came when he thought of his mother and, after that, his father.

This method has some features in common with the Freudian technique as described by him in his *Collected Papers* (2, Vol. II, p. 355). The chief difference, obviously enough, is that the child is limited in his free associations to the words father and mother. In this feature it is more like the Word Association Method of Jung. But whereas in the latter the individual is asked to respond with but one word, in the present method the mind-set given is less constrained. At best the method yields a dynamic sampling of all interacting processes of child and parent as perceived by the child. At worst it yields a fair picture of fixed attitudes and stereotypes acquired by the child.

C. THE CHILDREN INTERVIEWED

One hundred and fifty children—76 boys and 74 girls—were interviewed by the foregoing method. The children were carefully selected from three schools³ to represent three levels of economic

³For the splendid responsiveness of public school authorities, without whose cooperation the project would not have been possible, the writer

background—high, average, and low.⁴ The median age of the boys as well as the girls was 12 years. The boys ranged in age from 9 to 16 and the girls from 9 to 15. Approximately 90 per cent of both boys and girls examined were between 10 and 14 years old. All the children were from the upper grades of grammar school—fifth, sixth, seventh, and eighth. Sixteen boys and 17 girls were from the fifth grade; 18 girls and 21 boys from the sixth; 20 girls and 18 boys from the seventh; 20 of each from the eighth grade. The median intelligence quotient of both the boys and the girls examined was 107.5. The IQ 's of the girls ranged from 72 to 162 and the boys' range was from 72 to 148. Almost 50 per cent of the boys as well as the girls had IQ 's from 90 to 110. The Q_1 and the Q_3 for the girls were 97.5 and 122.5, respectively; those of the boys, 97.5 and 117.5.

D. THE FINDINGS

The differences found in the reactions of boys and girls to their parents are in this study considered under two large divisions: (a) *Differences in children's notions of parents.* Under this caption are presented, first, the difference in the content of children's reactions to parents and, secondly, sex differences in the descriptive nature of these notions. (b) *Differences in the nature of children's notions.* Under this caption are presented data concerning differences in feeling tone, in form of emotional expression and style of expressiveness as described in the study.

1. *Differences in Children's Notions of Parents*

a. *What boys and girls think of their parents.* For the purpose of comparing the notions boys and girls have of their parents all their 3,000 reactions were classified by the scheme of categories reported in Table 1. The categories used were not predetermined and are not very abstract. They are merely words and phrases to suggest the nature of the mental content of responses included in

wishes to acknowledge his indebtedness to the following: Mr. George R. Johnson, Director of Tests and Measurements, and the following principals: Miss Jennie Wahlert, Miss Ida Lee Woody, Miss Mary A. Thompson and Mr. W. D. Buchanan. To all cooperating teachers as well as children used as subjects the writer expresses his gratitude.

⁴For a description of differences in attitudes due to economic level see (10).

TABLE 1
DIFFERENCES IN NOTIONS OF PARENTS

		Girls			Boys		
		Both %	Mo. %	Fa. %	Both %	Mo. %	Fa. %
1.	Activities	20.7	20.5	21.0	22.1	23.4	20.7
2.	Does things for you	14.8	21.2	8.3	12.7	13.7	11.6
3.	Takes care of you	11.5	7.8	15.3	10.7	9.3	12.1
4.	Treatment and discipline	10.6	10.5	10.6	13.0	12.7	13.3
5.	Personality characteristics	9.6	11.0	8.0	8.1	10.6	5.7
6.	Takes me	8.9	6.0	11.9	9.3	7.4	11.2
7.	Gives me	7.0	4.7	9.4	5.3	3.5	7.2
8.	Plays with me	5.8	3.7	7.9	5.8	3.4	8.1
9.	Parental loyalty	5.3	8.1	2.3	4.2	5.4	3.0
10.	Physical characteristics	2.4	2.3	2.5	3.2	3.7	2.7
11.	Fact of relationship	2.1	3.2	1.0	2.0	2.7	1.4
12.	Life history	1.1	0.7	1.5	3.0	3.2	2.8
13.	Parental symbols	0.3	0.4	0.3	0.5	0.9	0.1

each category. Wherever possible these are expressed in the children's own words.⁵

Arranged in order of importance going from high to low, father as a composite picture means to boys: one who participates in various activities, is a disciplinarian, takes care of you, does things for you, takes you places, plays with you, gives you things, has certain personality characteristics, is one to love or who loves you, has had certain life experiences, has certain physical characteristics, is biologically related to you, and is base for thinking what a parent symbolizes. Similar composite pictures for what father means to girls and what mother means to each sex can easily be constructed from the data reported in Table 1. If for the sake of brevity the categories are referred to by their numbers rather than by descriptive words, these pictures are: father means to girls 1, 3, 6, 4, 7, 2, 5, 8, 10, 9, 12, 11, 13; mother means to boys 1, 2, 4, 5, 3, 6, 9, 10, 7, 8, 12, 11, 13; mother means to girls 2, 1, 5, 4, 9, 3, 6, 7, 8, 11, 10, 12, 13.

Some of the more outstanding sex differences in children's notions of parents are: *Does things for you* is more often the reaction to mother than to father, but it is more markedly the notion girls have of their mothers. *Takes care of you* is a notion children more

⁵Illustrative responses of these categories are given in (4) and (5).

often have of their fathers, girls more so than boys. Boys have more *treatment and discipline* notions of parents than do girls. Both boys and girls more often think of mother than father in terms of *personality characteristics*; the difference in favor of mother is more marked in the responses of boys. Father is more often thought of by both boys and girls as one who *takes me places, gives me things and plays with me*. Mother is more often thought of in terms of *parental loyalty and fact of relationship*. Both boys and girls think of the parent of the opposite sex more often in terms of *physical characteristics*—boys more so than girls.

b. *Differences in descriptive nature*. A picture of the differences in the notions of parents that boys and girls have has already been presented. For the purpose of gaining insight about the nature of these notions, the responses given were first classified in terms of levels of description. The categories used and the extent to which sex differences appear are indicated in Table 2.

TABLE 2
LEVELS OF DESCRIPTION

	Both %	Girls Mother %	Father %	Both %	Boys Mother %	Father %
Emotional	46.6	53.1	40.2	40.8	45.2	36.6
Social	20.4	15.0	25.8	22.4	17.5	27.2
Manual	10.4	15.6	5.3	11.8	15.3	8.3
Economic	10.4	5.4	15.4	10.8	5.1	16.5
Intellectual	6.3	4.3	8.2	6.6	6.4	6.7
Physical	5.9	6.6	5.1	7.6	10.5	4.7

The classification of the responses in the various levels of description was made in terms of dominant tone expressed. For example, if an item was dominantly economic but also carried with it a relatively warm feeling, it was classified as economic. Practically all the categories used are self-explanatory. Most of the items included under *manual* were factual descriptions of work done around the house. If like or dislike was expressed for the activity listed, the response was classified as *emotional*.

The foregoing results indicate that the girls outrank boys in responses to both parents on the percentage which are emotional in nature. Boys average a somewhat larger percentage of responses on

all other levels. More of the girls' responses to either parent are on the emotional level of description than are those of the boys. Both boys and girls give substantially more emotional responses for mother than for father. Boys more often than girls think of their mothers in terms indicating levels of description which are social, intellectual, and physical. - Girls more often than boys think of their mothers in terms which are emotional, manual, and economic. More of the boys' reactions to father are social, manual, and economic; more of the girls' reactions are emotional, intellectual, and physical.

2. *Differences in the Nature of Children's Notions*

Thus far in this study have been presented children's notions of their parents. The remainder of the study will be concerned with a description of attempts made to obtain insights about differences in the nature of the reactions. The facts and findings are presented under three captions representing three aspects investigated. These are: (*a*) differences in feeling tone of reactions including differences and algedonic ratios, (*b*) differences in form of emotional expression and (*c*) differences in manner of expression. All aspects were considered in terms of a rough continuum to which values were assigned to indicate direction and extent. The results in each case are presented in two parts. In Part *A* differences in degree of various categories are reported in terms of per cent. In Part *B* the facts are presented in statistical terms as indicated.

A description of other methods of evaluating reactions tried and an expression of the reasons for selecting the present categories as well as a report of the reliability of classifications used are presented in (9). All that is claimed for the classification schemes used is that they have clinical or social significance or both, that they are intelligible and that they lend themselves to fairly accurate analysis.

a. Differences in feeling tone of reactions. The analysis of the responses in terms of levels of description throws some light on the nature of children's notions. It tells little about the feeling tone expressed, the emotional freight carried in these reactions. For the purpose of getting information of this nature the responses were first classified in terms of degrees of pleasant, unpleasant, or indifferent feeling tone expressed. Reactions which carried no emotional load

at all were classified for what they were—mere description. The extent to which the reactions are variously toned is indicated in the first part of Table 3. In the second part of the same table data

TABLE 3
FEELING TONE OF REACTIONS

	Both.	Girls Mo.	Fa.	Both	Boys Mo.	Fa.
<i>A. Feeling tone of reactions</i>						
Pleasant { very	9.7	11.8	7.6	5.3	7.3	3.3
{ mild	44.4	44.6	44.3	41.2	39.0	43.4
{ barely	13.2	14.7	11.7	13.0	13.6	12.5
Indifferent {	0.7	0.5	0.9	1.7	1.2	2.1
{ barely	2.0	1.6	2.4	3.1	2.8	3.5
{ mild	2.7	2.3	3.2	3.0	2.4	3.6
{ very	0.7	0.9	0.4	0.7	0.4	1.1
Mere description	26.5	23.6	29.4	31.9	33.3	30.5
<i>B. Algedonic ratios of reactions</i>						
Mean	36.2	20.1	17.3	29.7	16.6	15.5
SD	17.1	10.0	9.4	18.5	9.9	10.1
SD mean	2.0	1.2	1.1	2.1	1.1	1.2
Difference between means	6.5	3.5	1.8			
% difference	21.9	21.1	11.6			
SD difference	2.9	1.6	1.6			
Diff./SD difference	2.2	2.2	1.1			

are presented in a more statistical manner in terms of algedonic differences. The algedonic ratios used are the algebraic sums of values assigned to the feeling tone of each reaction expressed. The values assigned the various degrees of feeling tone were: a value of +4 for a very pleasant reaction, +3 for a mildly pleasant one, +2 for one barely pleasant. The unpleasantly toned reactions were given values of -2, -3, and -4 for barely, mild and very unpleasant reactions, respectively. Indifferent reactions were given values of +1 and reactions classified as mere description were given zero values. A high plus value thus indicates reactions toned in the direction of pleasantness and a negative score indicates a tendency toward the unpleasant.

An analysis of the data in Table 3 concerning sex differences in algedonic ratios reveals the following facts: The girls as a group react to both parents with a more pleasant feeling tone than do the boys. The reactions of the boys toward their mothers as well as those of the girls are more pleasantly toned than are their

reactions to their fathers. Furthermore, the difference on reactions to mother is, statistically considered, more reliable than is the smaller difference on reactions to father; witness the $Diff./SD_{diff.}$ of 2.2 for the former as against 1.1 for the latter. The extent of these differences and the reliability of them are indicated in the table.

A glance at Part *A* of Table 3 suggests that whereas all the pleasantly toned reactions of all degrees—very, mild, and barely—of the girls add up to 67.3 per cent, those of the boys add up to 59.5 per cent.⁶ The larger difference between the two sexes is in their reactions to their mothers. The pleasantly toned reactions of the girls to their mothers and fathers add up to 71.1 and 63.6 per cent, respectively. The comparable percentages for the boys are 59.9 and 59.2. Six per cent of the girls' reactions to father and 4.8 per cent of their reactions to mother are unpleasant. For the boys the comparable percentages are 8.2 and 5.6. More specific differences are reported in Part *A* of Table 3.

b. Differences in form of emotional expression. *Hostility* and *adoration* are the extremes of the range in forms of emotional expression as classified in this study. The extent to which the reactions of the boys and girls fall into the various forms is indicated in Part *A* of Table 4. In Part *B* of the same table are presented in more statistical form the differences of the two sexes in their manner of emotional expression. In the scoring scheme used a plus score indicates a trend toward a favorable or acceptance reaction and a negative score indicates a tendency toward a hostile or unfavorable response. The actual values assigned to the various forms of expression were as follows: *hostility*, -3; *fear, shame, guilt or remorse*, -2; *ambivalence*, -1; *neutral acceptance*, 0; *respect* +1; *admiration*, +2; *adoration*, +3. The score indicating the direction of emotional expression for any one child was obtained by getting the algebraic sum of all values for all reactions given.

The data presented in Part *B* of Table 4 indicate that the girls as a group average more acceptance reactions to both parents as well as to each, singly considered. Both boys and girls average more acceptance or favorable reactions to mother than father. As indi-

⁶This is in accord with the findings about sex differences in forgetting of pleasant and unpleasant experiences reported in (11).

TABLE 4
FORM OF EMOTIONAL EXPRESSION

	Both	Girls Mo.	Fa.	Both	Boys Mo.	Fa.
<i>A. Form of emotional expression</i>						
Hostility	1.3	1.8	0.8	0.6	0.1	1.1
Fear	0.1	—	0.3	0.4	0.4	0.4
Guilt	—	—	—	0.1	0.1	—
Shame	0.1	—	0.1	0.1	—	0.1
Remorse	0.1	0.1	—	—	—	—
Ambivalence conflict	4.5	3.1	5.8	5.8	5.1	6.5
Neutral acceptance	24.8	22.3	27.3	33.3	36.3	30.2
Respect	58.8	59.6	58.0	53.6	50.3	56.8
Admiration—with sense of limitations	10.3	13.0	7.6	6.1	7.5	4.8
Adoration	0.1	0.1	—	0.1	0.1	—
<i>B. Direction of emotional expression</i>						
Mean	13.7	7.3	6.5	10.9	5.8	5.4
SD	8.6	5.4	4.2	8.2	4.6	4.4
SD mean	1.0	0.6	0.5	0.9	0.5	0.5
Difference between means	2.8	1.5	1.1			
% difference	25.7	25.9	20.4			
SD difference	1.4	0.8	0.7			
Diff./SD difference	2.0	1.9	1.6			

cated by the $Diff./SD_{diff}$ the differences are in all instances fairly reliable. The extent and reliability of these differences are reported in Part B.

A rough analysis of Part A in Table 4 indicates that the girls average somewhat more *hostile* responses to mother and the boys more to father. The only *guilt* reactions found were given by boys in response to mother. The only *remorse* reactions are found in girls' reactions to mother. More *ambivalent* responses to father are given by both sexes. Boys give more *ambivalent* reactions than girls. Boys give many more reactions classified as *neutral acceptance*. Girls give more reactions classified as *respect* as well as *admiration with a sense of limitations*.

c. *Differences in repressive and expressive reactions.* Psychoanalysts make much ado about the concept of repression. Mitchell (17, p. 29), for example, refers to it as "the foundation stone on which the whole structure of psychoanalysis rests."⁷ "Expression"

⁷See (11) for a consideration of this concept as an interpretation of forgetting.

and "freedom from repression" are often heard as cue phrases describing progressive education. Here again much that has been written is characterized by "either-or" thinking, as if individuals could be classified as either repressed or expressive types. The facts of individual differences and variations within an individual are thus forgotten. To get a somewhat more accurate picture of degrees of repression or expressiveness as well as the extent—the degree as well as the style of expressiveness—the reactions were classified under the 10 captions in Part A of Table 5. The classifica-

TABLE 5
MANNER OF EXPRESSIVENESS

	Both	Girls Mo.	Fa.	Both	Boys Mo.	Fa.
<i>A. Manner of expressiveness</i>						
Repressive	2.2	1.9	2.5	3.7	3.0	4.3
Good substitute	1.6	0.9	2.5	1.8	1.0	2.5
Judge	4.0	3.8	4.2	4.8	4.7	4.9
Blind love	2.3	3.2	1.3	0.9	1.2	0.6
Sense of duty or obligation	1.5	2.1	0.8	1.8	2.6	1.0
Model-guide	15.7	18.4	12.9	20.1	20.8	19.4
Appreciation	49.1	50.6	47.7	42.3	46.3	38.4
Companion	20.9	16.4	25.9	22.0	17.2	26.6
Reciprocal love	1.9	2.3	1.5	1.4	2.0	0.8
Pride	0.6	0.5	0.8	1.3	1.0	1.6
<i>B. Differences in extent of expressiveness</i>						
Mean	21.9	11.7	11.6	18.6	9.7	9.6
SD	13.7	7.6	8.4	16.3	8.4	10.1
SD mean	1.6	0.9	1.0	1.9	1.0	1.2
Difference between means	3.3	2.0	2.0			
% difference	17.7	20.6	20.8			
SD difference	2.5	1.4	1.6			
Diff./SD difference	1.3	1.4	1.2			

tions as there given are listed in order of degree of expressiveness ranging from the most repressive to the most expressive in a rough continuum. In Part B of this table the differences of the two sexes are presented in more statistical form. The scores used are the algebraic sums obtained by assigning the following values to the various categories: Minus scores were assigned for reactions classified as *repressive*, *God substitute*, *judge*, *blind love*, *sense of duty*, or *obligation*. In order named numerical values ranged from -5 to -1 . Plus values were assigned the other categories, the numerical values here being from $+1$ for *model-guide* to $+5$ for *pride*.

As arranged in Table 5 the classifications above *model-guide* include responses which are all relatively repressed. That is, they suggest attitudes which are unwitting or reactions that are unwilling. Examples of types of responses included in these categories will illustrate this fact. Sample repressive responses are: "*He hollers at us and beats us if we don't mind,*" "*If you ask him for something he says, 'No,'*" "*Everybody never talks back to her.*" Examples of responses classified as indicating a *God substitute* notion of parents are: "*She's the boss of the family,*" "*Always obey her,*" "*You have to ask him when you want to go out.*" Reactions suggesting less infallibility than the *God substitute* notions were classified as *judge* notions. Illustrative of such reactions are: "*If she asks me if I've done something and I haven't done it yet, should tell her the truth,*" "*Shouldn't ask question 'why' because he has a good reason,*" "*Punishes you when you do anything wrong,*" "*Well, mother's good and gives me most anything I want except things that are bad for me.*" Some *blind love* responses are: "*Everybody loves her mother,*" "*Well—I think she's the nicest person I can think of.*" Examples of responses indicating *sense of duty or obligation* are: "*Every child ought to take good care of mother and obey her,*" "*I should try to help her when I get bigger.*"

Reactions of the nature discussed in the foregoing paragraph add up to only 11.6 per cent of total responses given by girls and 13 per cent of those given by boys. Girls average somewhat more such reactions for mother than father whereas boys average more such in response to father. Girls give more *blind love* reactions to both parents. Both boys and girls give more *blind love* reactions for mother than for father. Boys average somewhat more reactions suggesting *sense of duty or obligation*. More such reactions are given by both sexes in response to mother than to father.

Boys more often think of parents with *pride* and as *model-guides* or *companions*. Girls more often consider parents in terms of *appreciation* and *reciprocal love*. Girls think of mother much more often than father as *model-guides*; the difference in favor of mother as considered by boys is very small. Examples of responses classified as *model-guide* are: "*She loves me and I love her,*" "*Something that I own and something that owns me—kind of united.*" "*A*

woman I respect and love" and "I respect him and love him" illustrate *pride* responses.

As indicated in Part B of Table 5 girls average somewhat more *repressive* reactions to either parent than do the boys. This implies that they average more cover-up responses and fewer direct expressions. The reliability of the differences, however, as indicated by $Diff./SD_{diff}$, is relatively small. These differences are in accord with the differences in the notions of parents given by boys and girls as reported in this study as well as in *Middletown*.⁸

E. SUMMARY

1. *Of the Study*

Seventy-six boys and 74 girls from Grades V to VIII of three schools representing three economic levels were examined by a Free Association Interview. By the use of this method 20 reactions, 10 for each parent, were obtained from each child. The method yields a dynamic sampling of interacting processes of parents as perceived by children and is susceptible to quantitative treatment. The differences in the reactions of boys and girls have been evaluated in terms of two large aspects: (a) differences in content or actual notions and, (b) differences in the nature of these notions.

2. *Sex Differences in Notions of Parents*

Father as a composite picture to boys is: one who participates in various activities, is a disciplinarian, takes care of you, does things for you, takes you places, plays with you, gives you things, has certain personality characteristics, is one to love or who loves you, has had certain life experiences, has certain physical characteristics, is biologically related to you, and is base for thinking what a parent symbolizes. Similar composite pictures of boys' attitudes to their mothers and girls' attitudes to each parent are reported in Part II of the paper proper.

3. *Differences in the Nature of Children's Reactions*

a. *Differences in the descriptive nature of children's reactions.* Girls outrank boys in responses to both parents on the percentage

⁸See (6 p. 524, Table XV).

which are emotional in nature but boys average a somewhat larger number of responses on all other levels—social, manual, economic, intellectual, and physical. Mother evokes more emotional responses than father from both boys and girls. More of the boys' reactions to father are social, manual, and economic; more of the girls' reactions are emotional, intellectual, and physical. Girls more often than boys think of their mothers in terms which are emotional, manual, and economic; boys more often think of their mothers in terms social, intellectual, and physical.

b. Differences in feeling tones of reactions. The girls as a group react to both parents with a more pleasant feeling tone than do boys. The reactions of the boys toward their mothers as well as those of the girls are more pleasantly toned than are their reactions to their fathers. The extent of these differences and the specific differences on reactions of all variations in feeling tone are reported in Table 3 of the study.

c. Differences in form of emotional expression. Girls as a group average more acceptance reactions to both parents as well as each singly considered. Both boys and girls average more acceptance reactions to mother than father. Girls average somewhat more hostile responses to mother and the boys more to father. More ambivalent responses to father are given by boys as well as by girls. Boys give more ambivalent reactions than girls. More specific findings of this nature are reported in Table 4.

d. Differences in repressive and expressive reactions. Reactions wherein parents were considered as God substitute, judge, in terms of blind love, or sense of duty were classified as repressed responses. Reactions which indicated that parents were thought of in terms denoting model-guides, appreciation, companionship, reciprocal love, or pride were classified as expressive reactions. The sex differences found in such reactions are reported fully in Table 5. Some of the more significant or interesting differences are: Girls give more blind love reactions to both parents. Both boys and girls give more blind love reactions to mother than to father. Boys average somewhat more reactions indicating sense of duty or obligation and more such reactions are given to mother than to father by both sexes. Boys more often think of parents as model-guides, companions, or

in words denoting pride. Girls more often consider parents in terms of appreciation and reciprocal love. In general, girls average more repressive reactions and less direct forms of expression than do boys.

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THE PSYCHOLOGICAL FIELD AS A DETERMINANT
OF THE BEHAVIOR AND ATTITUDES OF
PRESCHOOL CHILDREN*

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That juvenile delinquency and other behavior problems vary markedly in relative frequency for "good" and "poor" homes and neighborhoods has been amply demonstrated. However, it has seemed difficult or impossible to isolate any one or any few factors as being generally responsible for the various behavior problems found in delinquency areas. It would seem that the physical factors of the home and neighborhood are contributory factors rather than direct causes of serious maladjustments.

Broken homes, too, have contributed a proportionately larger share of delinquents and other behavior problems than have homes in which the normal constellation of two parents and their children is not broken. And, yet, careful individual case studies reveal that it is not the broken home, nor the poverty, nor any other single factor which may be isolated that accounts for the child's behavior but rather the total character of the environment to which the child reacts intellectually and emotionally, i.e., the psychological field—as Lewin (3) and others have shown. In a previous study the writer (6) concluded that:

No single factor either biological or environmental shows a marked relationship to the child's social adjustment. An evaluation of any one or all of the objective factors which have influenced the child is inadequate unless we know how these conditions have affected his personality and how they have affected the attitudes toward the problems of life which he has developed. . . . It would seem then that social adjustment is largely a matter of integration, the result of the total situation—the unity of elements which has influenced the development of the child.

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Thus the behavior of a child appears to be determined by his nature and the relationships which exist about him. Physical, social, and psychological relationships constitute the psychological environment or field to which the child responds. As long as he is living and functioning in a given environment his behavior will be determined by the relationships which are contained in that environment. Consequently, in studying the behavior of children it is necessary to consider the environmental relationships involved. Partridge says "Throughout this book the point has been stressed that all understanding of the behavior of young people in its broad aspects is quite impossible unless the total situation, the psychological field in which the individual operates, is taken into consideration."

Close contact with children in a W.P.A. Nursery School over a period of seven years has afforded an opportunity to study the behavior of children from subnormal homes. All of the children enrolled in the school come from homes of very low income or relief status. In the majority of these cases the normal pattern of two parents and their children has been interfered with in some way. However, one of the most marked and continuous observations throughout the seven years has been noting the ease with which the majority of children, regardless of home background, adjust satisfactorily to the nursery school situation. There is marked variability, of course, in the length of time required to make the adjustment and in the way in which, and the degree to which different children are able to make wholesome adjustments. Very frequently through casual observation attention has been called to children from some of the seemingly poorest homes, psychologically as well as financially, who were encountering very few if any problems.

In an attempt to secure more reliable and objective data on the problem intensive study was made of a group of 30 children, 14 boys and 16 girls, enrolled in the nursery school for a period of not less than nine months.

Information was compiled on the nervous habits of the children, their routine habits, certain other aspects of personality and their general adjustment to the nursery school situation. All of these data were secured by the nursery school staff, student assistants,

and advanced and graduate students in the field of psychology by the technique of controlled observation.

The nervous habits of the children were studied following the time-sampling method used by W. C. Olson (4). Five workers observed each child for four intervals of three minutes each. The observations extended over a period of two months. Each child was observed on different days of the week and during varying periods of the day's activities. All observers were given a training period of one week to insure uniformity in procedure and recording.

On the whole the results agree quite closely with those of Olson when reduced to equivalent figures, i.e., an equal number of children for the same period of time. The total number of nervous habits as well as the number of nervous habits for six of the nine subgroups was somewhat lower for this group than was found by Olson, and but slightly higher for the other three categories. As was found by Olson, all children have some nervous habits, the differences are merely a question of degree. The finding that there was no relationship between age and the number of nervous habits also agrees with Olson's results. However, unlike Olson's study, no marked sex differences were found.

Olson found an increase in nervous habits for under-weight children. The present study not only verifies this finding but gives evidence that nervous habits show a marked increase with many other changes in the physical condition of the child as, for example: colds, epidemics, gastric disturbances, fatigue, loss of sleep, *et cetera*. Emotional disturbance of almost any sort tend also to increase nervous mannerisms.

Throughout the period of study the observers were impressed by the close relationship between any given child's nervous habits and his adjustment or relation to his physical and social environment. In no case could a child's nervous mannerisms be predicted apart from his physical and emotional condition and environmental relationships.

The routine habits which were observed regularly by the staff and assistants were habits of eating, sleeping, elimination, washing, dressing, and play. Two children were observed during one day's activities each month by all workers. Each worker checked the

habits in the particular routines which she supervised. Thus each child was observed intensively on nine different days during the period of study. Individual cumulative record cards were kept giving a rating of satisfactory, below normal, or very poor for each of the six habits observed. The record blanks provided space for special comments indicating the nature of the problem presented when the ratings were not wholly satisfactory together with any possible causal factors noted.

While there were wide variations in the ratings on any given trait among individual children the group as a whole were very little, if any, below average in their routine habits on the basis of the norms suggested by Blatz-Millichamp and Fletcher (1), Foster and Mattson (2), Updegraff (7), and others. The results seem to compare very favorably with the findings in similar studies using children from homes of average or superior socio-economic status.

Unlike nervous habits most of the routine habits are closely related to the child's age and to his physical development. Children at the age of two usually are conspicuously poor in motor control. There is much dawdling at meals, at the lavatory, and in dressing and undressing. The two-year-old is little interested in other children. He may play side by side with them but he plays independently. His physical activities involve few of the finer coördinations. Each succeeding year brings striking development in motor control and, with wise guidance, the routines are carried out with increasing speed and skill. Buttons which are fumbled by the two-year-old are manipulated with adeptness by the age of four or five. At five years the handle of the spoon is gripped with the thumb and finger quite as does an adult rather than with the whole palm as at two.

Again marked variations were found in the group for the customary habit patterns of each child. Some children, almost invariably, showed a ready acceptance of food and efficient habits of eating. Some of the same children and others fell asleep almost immediately and slept soundly throughout the one- to two-hour rest period. Afternoon sleep habits are related closely to the age of the child. At two the child still retains the infant habit of falling off to sleep almost as soon as he goes to bed and sleeping from

one to two hours, but between the ages of four and five years he may begin to give up his daytime sleep.

Highly satisfactory habits were found for some children for each of the routines. On the other hand some children, quite consistently, presented problems in some or all of the routine habits. By studying the comments of the staff on the rating cards to explain deviations in rating it appeared that any marked variability in the behavior of any given child from his customary patterns of responses could be associated, in most cases, to his physical condition or to some disturbance in his social or emotional relationships with his playmates, some member or members of the staff, and not infrequently to some disrupting influence in the home. Inability to manipulate objects successfully such as buttons, combs, towels, soap, toothbrushes and faucets, or the introduction of anything new or different into the environment, as, e.g., a new or strange staff member, rearranging of furniture, adding or discarding pieces, were almost certain to cause variation in the usual behavior patterns of some children and to be totally ignored by others. For some children reorientation was necessary in the light of the new relationships. Even after their routine habits appeared to be very well established any marked change in the relationships involved tended to disrupt behavior patterns somewhat.

Other aspects of personality which were studied for each child individually by five observers were self-confidence, ability to adapt to difficulties, emotional development, leadership, and social adjustment. Situations were planned during the routine and play periods which called for a display of self-confidence or the lack of it, and the subject's reactions to difficulties as in turning faucets, securing a desired toy, using play equipment, *et cetera*.

Emotional development was measured not only in terms of control of fear and anger but also in the expression of positive emotions such as friendliness, sympathy, and affection.

Participation in group activities, the use of toys in dramatic play, and interest in and attitude toward others were used as the bases for measuring leadership and social adjustment.

Again the group of children studied appeared to be very little below normal in the traits studied. Such differences as were

found may be explained in terms of a somewhat lower level of mentality as was shown by mental test results, which may be expected from their inferior socio-economic status, rather than in terms of any physical, social, or psychological factors of the home.

As with the routine habits development in these traits increased with age, partly through maturation and partly through learning. The five-year-old controls his emotions more easily than does the younger child. He is able to recognize and interpret the emotions of others, and in addition to fear, anger, and affection, which are the only well defined emotions at two, jealousy, sympathy, humor, and perhaps others have become clearly established.

From two to five years changes in social behavior are particularly striking. However, children of the same age often vary widely in their reaction to difficulties, their degree of emotional control and in their stage of social development. And, the same child may have unusual self-confidence in one situation or on a certain occasion and show very immature behavior in other situations.

Emotional control is very definitely influenced by the child's relation to his physical, social, and psychological environment. A child who under ordinary circumstances enjoys sliding down the fire escape may become very frightened on a cold or rainy day or with a strange person in charge. As with adults, the child who is a leader in some situations becomes very submissive in others or even in the same situation with a slight change in status.

From the foregoing it appears that children's behavior and attitudes are not predictable in absolute terms. An understanding of any child comes through a study of the child in relation to his surroundings—to his psychological field. In as much as his behavior is a reflection of past experience a thorough understanding of the physical, social, and psychological aspects of his home and particularly of the child's relation to these aspects are essential for wise guidance. However, intensive study of this small group of children does not justify the conclusion that children from financially and psychologically poor homes present any more problems for preschool training than do other children.

Home background, undoubtedly, is the most important psycho-

logical field in determining the behavior of a preschool child since most of his adjustments are made in the home. There are many and very vital relationships that should be evaluated in studying the possible effects of the family background on a child's behavior. Nevertheless, the essential factor in determining a child's behavior and attitudes does not seem to be closely related to any particular aspect of the home or other environmental influences. They seem rather to be determined by the particular nature of the child and his relation to the total character of the psychological field in which he must function.

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APPARATUS

The Journal of Genetic Psychology, 1943, 62, 335-336

THE SLIDING FRAME: RULED PAPER FOR USE IN PREPARING WORK SHEETS

Cambridge, Massachusetts

MARIE L. H. FORBES¹

Figure 1 shows a sheet of paper ruled for use by the experimenter who prefers to dispense with the sliding frame in preparing work sheets for a child.

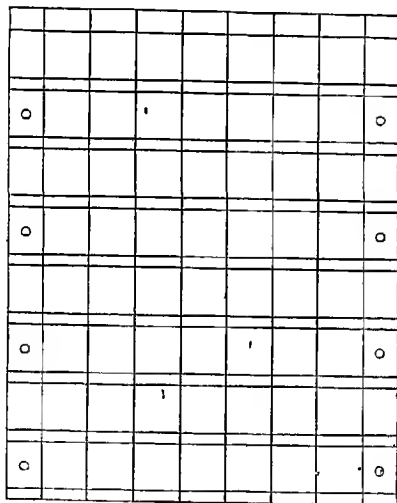


FIGURE 1

SPECIFICATIONS

Paper 8½ in. x 11 in.

¹Received in the Editorial Office on September 29, 1941.

²The writer gratefully acknowledges the examination of the materials by her former instructor, Dr. Walter F. Dearborn, Director of the Psycho-Educational Clinic, Harvard University.

Horizontal lines: 1st line $\frac{1}{2}$ in. from top of sheet, subsequent lines alternately $1\frac{1}{16}$ in. and $\frac{1}{4}$ in. from the preceding line.

Vertical lines: 1st line $\frac{3}{4}$ in. from edge of sheet, subsequent lines 1 in. from preceding line.

Punches: 4 pairs of holes $\frac{3}{16}$ in. *D.*, outlined or cut, the center of each hole $\frac{3}{8}$ in. from edge of sheet, $7\frac{3}{4}$ in. from center of hole in opposite margin and $\frac{1}{2}$ in. from horizontal line just below it.

The above specifications refer to the sliding frame described in this Journal (accepted July 28, 1941).

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TAPE PRINTING BOARDS REVISED

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In the present revision of the Tape-Printing Boards described in this Journal (1939, 55, 449-451), printing frame and block tray are constructed on the plan shown in Figure 1, the former with two, the latter with three or more compartments.

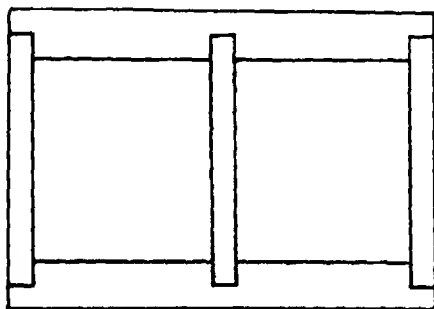


FIGURE 1

TRAY AND PRINTING FRAME

Sides of tray and printing frame are both cut from a strip of wood $\frac{9}{16}$ in. wide, $\frac{1}{4}$ in. thick, with grooves $\frac{1}{8}$ in. x $\frac{1}{8}$ in. at intervals of $\frac{15}{16}$ in.

Floors are cut from a strip $1 \frac{9}{16}$ in. wide, $\frac{1}{8}$ in. thick. In frames and small trays the floors extend $\frac{5}{8}$ in. beyond the side of the frame or tray at either end.

Partitions $1 \frac{5}{16}$ in. long are cut from a strip $\frac{9}{16}$ in. wide, $\frac{1}{8}$ in. thick, cross-pieces from a strip $\frac{1}{2}$ in. wide, $\frac{1}{8}$ in. thick.

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BOARDS ASSEMBLED

The boards are of three-ply wood, $\frac{1}{8}$ in. thick.

Board No. 1. Tray, uncovered, $3 \frac{5}{16}$ in.; printing frame, $2 \frac{1}{4}$ in.; with a cover $2 \frac{1}{4}$ in. in which are cut two holes, a square and an equilateral triangle. No rubber dies.

Board No. 2. Tray, uncovered, $10 \frac{3}{4}$ in.; rectangular color blocks; roll of ten-color tape in frame. No rubber dies.

Board No. 3. Three trays, each $3 \frac{5}{16}$ in.; rubber dies consist of circle, square, equilateral triangle, solid. Black or colored ink.

Board No. 4. Tray $6 \frac{1}{2}$ in.; rubber dies consist of cross, circle, square, equilateral triangle, diamond and five-pointed star in outline.

Board No. 5. Tray $6 \frac{1}{2}$ in.; rubber dies consist of domino dots $\frac{1}{8}$ in. *D.*, set in $\frac{1}{2}$ in. square.

Board No. 6. Three trays, each $10 \frac{3}{4}$ in.; rubber dies consist of one of the alphabets previously used, or a vertical manuscript writing alphabet; capitals $\frac{1}{2}$ in. high, small letters at least $\frac{5}{16}$ in. high.

Board No. 7. Space reserved for Sliding Frame described in this Journal (1940, 57, 219-220) or revisions of it.

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BOOKS

The *Journal of Genetic Psychology*, the *Journal of General Psychology*, and the *Journal of Social Psychology*, will buy competent reviews at not less than \$2 per printed page and not more than \$3 per printed page, but not more than \$15.00 for a single review.

Conditions. Only those books that are listed below in this section are eligible for such reviews. In general, any book so listed contains one or more of the following traits: (a) Makes an important theoretical contribution; (b) consists largely of original experimental research; (c) has a creative or revolutionary influence in some special field or the entire field of psychology; (d) presents important techniques.

The books are listed approximately in order of receipt, and cover a period of not more than three years. A reviewer must possess the Ph.D. degree or its equal in training and experience.

Procedure. If among the books listed below there is one that seems important to you, you are invited to write a review of that book. It is not necessary to make arrangements with the Editor. Just send in your review. It does not matter if the book in question has been reviewed before.

(1941)

- ZIPP, G. K. *National Unity and Disunity*. Bloomington, Ind.: Principia Press, 1941. Pp. 408.
- REIK, T. *Masochism in Modern Man*. New York: Farrar & Rinehart, 1941. Pp. 439.
- BRITT, S. H. *Social Psychology of Modern Life*. New York: Farrar & Rinehart, 1941. Pp. 562.
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(1942)

- SHELDON, W. H. *The Varieties of Temperament*. New York: Harper, 1942. Pp. 520.
- KLOPPER, B., & KELLEY, D. M. *The Rorschach Technique*. New York: World Book, 1942. Pp. 436.
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- HOLLINGWORTH, L. S. Children Above 180 IQ. New York: World Book, 1942. Pp. 332.
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- MCGEOCH, J. A. The Psychology of Human Learning. New York: Longmans, Green, 1942. Pp. 633.
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- SEASHORE, C. E. Pioneering in Psychology. Iowa City: Univ. Iowa Press, 1942. Pp. 232.
- RAPAPORT, D. Emotions and Memory. Baltimore: Williams & Wilkins, 1942. Pp. 282.

1943

- GESELL, A., & ITO, F. L. Infant and Child in the Culture of Today. New York: Harper, 1943. Pp. 399.
- LEEPER, R. W. Lewin's Topological and Vector Psychology. Eugene: Univ. Oregon, 1943. Pp. 218.

CRITICAL REVIEWS OF RECENT BOOKS

(*Thorndike, E. L. Human Nature and the Social Order. New York: Macmillan, 1940. Pp. 1019.*)

REVIEWED BY HERBERT S. CONRAD

With proper scientific skepticism and irreverence, our first question may be whether present psychological knowledge justifies a thousand-page volume on *Human Nature and the Social Order*. One would surmise—and a reading of the book supports the assumption—that Dr. Thorndike's volume includes, besides social psychology, a generous portion of social philosophy, borrowings from various social sciences, common sense, and personal opinion. Such a volume, even if not exclusively scientific, may still be highly praiseworthy: the views of an enlightened psychologist in this field should have as much unique value as those of, shall we say, an economist, sociologist, statesman, etc. But inference and opinions should be demarcated from statements firmly buttressed by scientific findings. In common with most other writers in this field, Thorndike has failed to do this. The present volume, as a result, is best read with some critical or skeptical alertness.

The volume is divided into two parts. Part I, presenting "General Facts and Principles" (400 pages) is mainly a résumé of Thorndike's previous writings on individual differences, abilities, learning, wants, attitudes, and values. Part II, presenting "Special Facts, Principles, and Applications," is intended as the more "practical" part of the volume. The range of Part II is very wide indeed; among the topics treated are: philanthropy; natural resources and capital; labor and management; buying and selling; money and credit; the psychology of capitalism and alternative economic systems; functions and criteria of a good government; rulers; citizens; law; and reform. The reader may object that no one psychologist should undertake to cover topics so numerous, so varied, and so difficult as these. It is to be hoped that Thorndike's noteworthy effort will stimulate further concentration in these fields.

Among the compelling qualities of this volume are the conscientiousness and forthright sincerity of the author. Dr. Thorndike does not shrink from the unpopular or unpleasant statement; and he is willing to express criticism without the customary befogging indirection. Some examples seem worth quoting. Thus, with regard to the problem of "types," Thorndike says:

There are no reasonable simple classifications into mental types. . . . They are proposed mostly by literary men and psychiatrists who are ignorant of nearly all that has been done in the measurement of correlations (p. 271).

With regard to advertising:

From the point of view of the welfare of a nation or of the world, advertising causes a great waste of money by sellers and of time by buyers. . . . Most buyers will profit more from an hour spent in reading *Consumer's Research* or in consulting some impartial expert than from a hundred hours reading of advertisements. In fact their net profit from the latter is likely to be negative (p. 628).

And finally, with regard to such generally popular taxes as the income- and inheritance-tax, Thorndike expresses himself:

I conjecture that income and inheritance taxes have slowed down the increase in the general welfare of the people which was so rapid from about 1850 to 1900, but may have increased and improved their schooling. But this is only a conjecture (p. 821).

The volume is salted with a fair number of shrewd and, at times, eloquent observations. No reviewer could resist citing a small sample of these. Thus, speaking of "payments for human factors," Thorndike writes:

Payment is never in money alone, and the payment is never exactly described in the contract. There are always features of health, physical and human surroundings, social esteem, dignity, fitness to individual idiosyncrasies and other things beyond what can be specified. Even when additional facts about the nature of the work could be known to both parties, they rarely are specified in the contract (p. 655).

• With regard to the selection of candidates for political office:

In all large political units and in most small ones selection

is by a governing class. . . . Governing classes select the candidates as well as influence the votes on them. They [the governing classes] naturally select [the candidates] from their own membership, even if they are largely moved by a genuine interest in public welfare. Except by an almost super-human objectivity a governing class cannot think that it is unfit to govern (p. 794).

With regard to popular estimates of the outcome of social innovations:

Non-scientific estimates of consequences are sadly untrustworthy. The national prohibition of the sale of alcoholic liquors did not have the consequences which millions of people expected who worked to attain it. . . . Coeducation was viewed with alarm as a sure stimulus to both sensual and romantic love, but its actual consequences seem to have been the opposite. Among all the consequences . . . blessed and dire, which were expected from the granting of votes to women, which were real? (pp. 376-377).

With regard to literary psychology:

Literary men are primarily entertainers. . . . They may entertain millions, or only a few. They may entertain all men, or mainly the dull, or mainly the intelligent. But they must entertain, and many of them will put in writing ideas about human nature . . . which strike them as interesting, without spending even one hour per idea to discover whether the ideas are true (p. 353).

With regard to the refractory nature of man:

The perfectibility of human nature is wisely put by religions in a heaven with not only an optimal environment but also infinite time (p. 330).

The favorable qualities of Thorndike's treatment were sufficient to carry the present reviewer, at least, from the beginning of the book to its rather distant end. On the whole, however, it must be said that the volume is disappointing. Part I, devoted to "General Facts and Principles," seems provincial: Thorndike has neither benefited much from criticisms of his own work, nor adequately recognized the important contributions of others. Thus, Thorndike still clings occasionally to a theory of the "flowering of instincts"—whereby the mammal guarding its young is transformed into the

traffic cop handing you a "ticket"! (p. 741). Surely Thorndike must have been told that measuring a person's wants by his expenditures of time and money is crude and inadequate: some wants are better measured by what we *don't* spend time and money on, but wish we *could*; nevertheless, Thorndike's old treatment and conclusions on this topic have been trotted forth without any noticeable revision. Thorndike dismisses the utility of psychoanalytic contributions on a completely *a priori* basis by the statement, "The science of psychology finds no identifiable realities corresponding at all exactly to Id, Ego, Super Ego . . . but rather continuous gradations from unorganized to organized, bad to good, carnal to spiritual . . ." etc. (p. 339).

There is unconscious yet obvious self-deception in Thorndike's statement that he has "neither accepted nor denied" various of the Freudian "doctrines" (p. 336). The whole of Chapter 8, on Mental Dynamics, omits completely any mention of any psychoanalytic mechanisms; and the word "unconscious" does not appear in the Index. According to Thorndike, the facts of psychoanalysis are applicable mainly to "disorganized hysterical minds": and "a sound way to treat such [persons] in government, business, law, education and religion is to neglect their follies and proceed with the world's work as if they were sensible persons or troublesome children" (p. 337). Is it too much to suggest that exactly such a viewpoint and treatment maintains the solid line of recruits to our mental hospitals, and has probably contributed to the rise of Hitler and other neurotic demagogues? Apparently, for Thorndike, mental hygiene is but a minor luxury among the main fruits of psychology.

Part I of this volume is provincial also in its neglect of cultural frames of reference. Thorndike is concerned with Man—but this turns out to be the evolutionary biologist's man, rather than the anthropologist's or sociologist's or historian's *men*. Thorndike observes that:

The Japanese quickly absorbed Europe's technology and science though they were little influenced by its religion. Many Negro tribes in Africa quickly absorbed the Mahometans' religion though they were little influenced by their science (p. 215).

No attempt is made to explain such discrepancies. Similarly Thorndike suggests, wisely enough, that the energy formerly devoted to the hounding of heretics could better have been used for the destruction of rats (p. 197); but he fails to consider why the energy went in one direction and not in the other. Had the explanations for these events lain in the realm of biology, it is not likely that Thorndike would have shirked or avoided the task of genetic analysis.

Perhaps the most useful contribution of Part I is its emphasis on the value of reward vs. punishment as a factor in learning:

There doubtless will always be need for punishment and threats of punishment, but the extent to which they have been reduced in intelligent families and in schools during the last two or three generations, apparently to the benefit of all concerned, gives promise that much can be accomplished [in this direction] in government, law, and religion (p. 208).

Elsewhere, Thorndike laments that—

. . . we have no benefactor law as a counterpart for criminal law. . . . The voice [of the law] is threatening and its acts are punitive. Not the law, but Mr. Carnegie, rewards heroes. Not the law, but Mr. Nobel, rewards benefactors (pp. 202-203).

As a matter of fact we do have, in the United States, at least the beginning of a significant "benefactor law" in the Soil Conservation Act, which provides for benefit-payments to farmers who adhere to certain socially desirable farming practices; and this system seems to have worked fairly well—without the aid of any Carnegie or Nobel. But it must be recognized that such a system of "benefactor law" is very expensive. To emphasize rewards for the numerous deserving, rather than punishment for the occasional culprit, might be ideal; but practical limitations would seem to require that, to a large extent, virtue remains its own reward. This does not imply that unusual service should go without the recognition of the law.

Certain critical comments apply to both Part I and Part II of the volume. *Thorndike insists on writing in generalities*. In the physical sciences, a generality adequately covers innumerable particulars; in the social sciences (including psychology), the qualitative and quantitative modification of generalities according to the specific problem or situation is essential. Where, for example, does discussion at the level of the following quotation get us?

The relation between two sides in a conflict of interests is at the root of government and law. . . . Communities have established and tolerated a great variety of methods of terminating such conflicts. Many of these methods are grossly unjust, but may be better for the community than a combination of strife and suspense. They may, however, be worse (p. 751).

Discussion at this level of generality is hopeless. Had Thorndike applied available psychological and other knowledge to a discussion of specific problems or remedies—such as the selection of impartial judges, the injunction, the secondary boycott, the indeterminate sentence, etc., some benefit would accrue. None of these specific topics is considered or mentioned. Unfortunately, this is fairly typical. It is, to be sure, exactly what Thorndike would avow as his deliberate intention: to provide a *general* discussion of Human Nature and the Social Order. But it is an ill-conceived intention.

Writing in terms of generalities in the social field can tempt an author into various other errors; one of these, to which Thorndike seems prone, is the over-simplified application of a specific experimental finding to a very broad field: in a word, over-generalization. How many social psychologists, for example, keeping in mind certain New Deal innovations (such as the Soil Conservation Act), would agree with Thorndike that "recent psychological experiments reinforce very strongly the argument that freedom of contract is superior to coercion by either custom or government" (p. 701)? What psychologist or group of psychologists has had the resources to conduct "experiments" of a scope and nature to justify so sweeping a generalization? The Germans and Russians, to cite two conspicuous examples, seem to have created markedly "superior" military machines, despite a considerable increase in "coercion" all along the line. Would Thorndike urge that the former (pre-war) volunteers in the United States Army are notably superior to the recent draftees (probably the reverse is true)? The same drive toward over-simplified generalization can be seen in the assertion that "Many of the elementary facts of government appear in the nursery" (p. 729). Does Thorndike seriously consider that problems of machine politics, proportional representation, campaign exaggerations and misrepresentations, unicameral vs. bicameral legislatures, etc., can

be best studied—or even profitably studied—by observation at the cradle or in the nursery room?

Writing in terms of generalities can also lead to an impractical disregard of the quantitative aspect of problems. Thus, there seems to be not very much point, at present, in defending the practice of charging interest: the crucial question (determined, very largely, by the Federal Reserve Board) is *how much* interest. Similarly, tariff vs. free trade is a comparatively academic question, compared to the quantitative problem of *how much* tariff, what *rate-of-change* in tariff schedules, the *degree* of encouragement of international free trade, etc. It is painful to see so quantitatively-minded a scholar as Thorndike lapse from quantitative grace, even if only occasionally.

Thorndike has indulged in some daring flights of imagination; for example, he speculates on what would happen to wages "in a world with its present genes but with all individuals having opportunity to be educated to the level of their capacity" (p. 668); whether a "wise trustee with power over the world" would immediately increase the birth rate so that more people could enjoy the blessings of an improved universe—or postpone the increase of population until he had made the universe still better! (pp. 441-442); etc. Some such speculations are presented as suggestions or even (in the currently fashionable term) "directives"; e.g., Thorndike considers that "... a man's spermatozoa should be at the disposal of the state or some board of trustees..." (p. 609); and that the reward accorded to any individual should be determined by a kind of general accomplishment-quotient ("a quotient or coefficient of merit or deservingness"), to be calculated according to the decision (presumably) of some "board of trustees for the welfare of mankind" (p. 207). Such fantasies seem merely entertaining, unless they be used as peaks from which one descends to reality. Thorndike, unfortunately, remains on the peaks.

Throughout the volume, and especially Part II, there is such a firm, consistent devotion to "general welfare" as perhaps deserves the characterization of "saintly." But Thorndike is a moderately hard-boiled saint. He insists on definitions. First we must know what is "*good*." This is the philosophical problem of evaluation; and, according to Thorndike, the problem can be objectively attacked: anything is good according to its consequences for good

people, both present and future. But experts are needed to evaluate consequences, because in the first place consequences are not always easy to determine, and in the second place "imbeciles and ignoramuses . . . do not know what is for their own good" (p. 351). "*General welfare*" is served by increasing the goods available for the good wants of good people.

There are doubtless more difficulties in these definitions or principles than may at once be apparent. On the practical side, to what extent would Thorndike's "experts" agree on the consequences (especially the indirect and delayed consequences) of various traits, practices, wants, commodities, laws, etc? On the logical side, how can we know *what* is good until we know first *who* is good (since something is good only as it benefits good people)? And how can we know *who* is good until we first know *what* is good (since the goodness of people depends on the consequences of what they do)? Possibly Thorndike would be on safer ground if he spoke in terms of the bad rather than the good: we are much more nearly agreed, for example, that arson and criminality are bad, than that teetotalism or membership in the Democratic Party are good.

Thorndike's principles of evaluation lead to numerous interesting suggestions; e.g., that a "reasonable system of weights" should be applied to people's votes: persons with mental or moral defects would be given zero weight (excluded from voting altogether, or their votes not counted); persons with children would be given greater weight than persons without any children; and sexagenarians (who have little time left either for the enjoyment or regret of the consequences of their vote) "should have less weight than men of thirty unless they are found to be wiser and more impartial" (p. 792). It must be added that here, as commonly elsewhere, Thorndike gives not the slightest hint of the practical implementation or administration of his suggestions. This is a troubling omission to the present reviewer, who believes that techniques of implementation and administration are too often the nub of a problem. Failure of Thorndike to consider this fact gives to the volume an air of academic, impractical "ought-itis": we are told what *ought* to be done, but little or nothing as to how it possibly *can* be done.

As a matter of fact, if everyone adopted Thorndike's underlying attitudes, it is doubtful if anything much toward social progress ever

would be done. Essentially, Thorndike is defeatist and conservative. The world is as bad as it is because the people in it are so largely bad; and the people are so largely bad because of their bad heredity or genes. Social environment plays a part, to be sure; but "after all, man's genes made the environment which now fashions him" (p. 305). Even if it were possible, theoretically, to improve man's nature through improvements of education, social institutions, economic adjustments, and such, it is doubtful that favorable results would ensue; because "if human habits are tampered with, they will get worse unless the tamperer is very skilful" (p. 850).

Despite his obvious devotion to human welfare and progress, Thorndike seems to be almost a perfect intelligent conservative. For all that is sound and good in the *status quo*—profound appreciation; toward many of our ills, patient tolerance or complacency; but towards recent social changes, skepticism or hostility. Says Thorndike (speaking in sublimely general terms):

It is reasonable . . . to attach a positive rather than a negative value to the civilization that has been bequeathed to us, and to require evidence that proposed changes will in fact have beneficial consequences (p. 380).

The consequences of social legislation . . . were until recently highly praiseworthy. The recent record is not so clear. It may be that putting welfare into the hands of politicians and voters is a backward step (p. 468).

The difficulty is to find any total arrangements of business, law, taxation, customs, etc., which will surely [*sic*] be better than our present arrangements. The particular proposals which governments are now adopting seem likely to get welfare out of the frying pan into the fire (p. 515).

Thus, the burden of proof is placed rigorously and absolutely on change. But to require irrefutable proof-in-advance that a change is good could effectively stymie all deliberate progress; since in the social sciences knowledge is generally too incomplete to furnish proof to the point of surety—or even, perhaps, to a point of very high confidence. Let us suggest that in view of the present plight of the world, it might in many cases pay everyone concerned to adopt a more lenient and experimental attitude.

A principal agency for conserving the *status quo* is the law.

Thorndike recognizes serious theoretical flaws in the law, but excuses them on the ground that "much less harm results than might be expected" (p. 908) (—also, presumably, much less progress). Thorndike's extreme complacency toward the law is not, however, extended to the principal present agency of reform, namely government:

Governments tend to aggrandize their powers at the expense of the governed, with more or less disregard of the welfare of all (p. 875).

It is significant that the able and benevolent men of affairs almost never give to a city, state, or national government . . . (p. 467).

Man's gain from the extermination of yellow fever and malarial mosquitoes . . . [and] from the inspection and treatment of water supplies . . . probably far outweighs his gain from all the activities of his elected representatives for the past twenty-five years (p. 407).

Without subscribing to the doctrine that elected (or appointed) representatives are shaped in the image either of science or of God, it is fair to point out that governmental aid directly promoted, and typically maintains, the improvements so highly valued by Thorndike in the last quotation above.

When confronted with a feasible present change, Thorndike is likely to propose a remote and perfectionistic alternative. The problem of distribution has long been with us. Thorndike tends to confuse the problem of the distribution of wealth with proposals for complete equality of wealth. He justly condemns complete equalization as a goal, but evades the problem of distribution, by urging greater and greater production! (pp. 416-418, 85). "Anyway," says Thorndike, "all such matters of distribution are of minor importance compared with the increase by the advancement of science and education, and the waste by war and folly" (p. 583). "Why make such a fuss about who owns things?" (p. 698).

Thorndike adopts the typical conservative's view that ". . . on the whole, modern civilization has been beneficent to the poor . . ." (p. 956). The predilection here is evidently toward comparing the present with the *worst* that has existed, rather than with the *best* that could exist. Such a viewpoint offers an intellectually gratifying

support for conservatism, but a mighty block against corrective reform. With such a viewpoint, a tubercular patient gasping for breath and spitting blood would presumably be congratulated on the fact that he was, after all, still alive and able to spit. Thorndike could, in all conscience, stand a heavy dose of the practical, clinical spirit! As it is, Thorndike is so bewitched, as apparently to accept quite casually the myth of "the capitalistic system of free enterprise and the liberal system of government with freedom of action for all within the law . . ." (p. 757).

How can so obviously conservative a volume end with a chapter on "Human Nature and Reform?" The answer is that the final chapter contains not a single specific, practical suggestion. Society should contrive to foster "better genes" (p. 957); "governments and peoples must be induced to use the truth" (p. 959); "the able and good should acquire power" (p. 959); wars between and within nations should be abolished (p. 960); "quality is better than equality" (p. 962); etc. Within the cradle of such generalities, progress could lie unawakened for many, many years.

One of the least attractive aspects of the present volume is its carping at the ordinary man's attempt to improve his standard of living. This, we are told, is for the most part merely a despicable attempt toward "keeping up with the Jones'," a psychologically reprehensible indulgence in conspicuous waste and inordinate self-display. Veblen is quoted to the effect that "the struggle to keep up appearances is chargeable . . . with one-half of the aggregate labor required for the support of the community" (p. 513). "Manufacturing," Thorndike avers, "is now largely of luxuries" (p. 540). For the ordinary man, evidently, a mattress on the floor, a tin cup, and perhaps a book borrowed from the library, are all that Thorndike's Spartan conception of life would seem to allow.

Thorndike seems more than a little skeptical of political democracy. Not without justification, he views the interests, abilities, motives, and habits of the average man with considerable misgiving. According to Thorndike, the common man is hardly entitled to a vote: ". . . people with few exceptions are indifferent to public affairs . . . except in their dramatic and personal aspects . . ." (p. 803). "The New England town meeting in even its most glorious epoch did badly what is now done much better by specialists and by

laws framed and administered by specialists" (p. 808). "The able and good should acquire power" (p. 959)—and they "must conduct a 'strong' government, using ruthlessly whatever means the end justifies" (p. 796). All this is doubtless intended by Thorndike for the people's own good (or, at least, for the good of good people); but this combination of paternalism, ruthlessness, and distrust or contempt for the common man smacks of fascist doctrine. Any psychologist can understand Thorndike's impatience with the common man; nevertheless, reforms within the framework of democracy seem preferable to dictatorship by a paternalistic oligarchy. Sweden is a better example for us to follow than Italy, Germany, or Russia.

Some important specific errors require mention. Statisticians will question seriously the validity of inferring causation from correlation coefficients, whether these be dressed up as "path coefficients" or not. The path-coefficient technique for the quantitative analysis of causation is of doubtful utility when (as usually in the social field) causation is more or less mutual or reciprocal. Even granting the validity of Thorndike's statistical conclusion that *P*, or quality of population, is at present the chief differential cause of welfare, it is well to realize that if *P* is not readily susceptible to change, we may as well concentrate on the other factors pertinent to welfare. New social inventions, it is conceivable, may cumulatively relegate *P* to a less and less dominant position.

Repeatedly the volume stresses the positive correlation among favorable traits; according to Thorndike, "there is a positive correlation of about .50 between ability and virtue or good will toward men" (p. 74). The implication of this, as Thorndike sees it, is that we are really pretty well-off: our capitalistic system of "free enterprise" tends to reward the "able"; and the able, in turn, tend to be men of good will. In this connection, Thorndike's admiration for the successful entrepreneur is practically unbounded. Not all, of course, is "as right as right can be"—after all, a correlation of .50 is not 1.00; but on the whole, implies Thorndike, we should be grateful.

Unfortunately, this general analysis has failed to consider two extremely important factors: (*a*) the selective process in the struggle for success; and (*b*) the dominant influence of the ethically marginal business man. The attainment of success does not require

first of all, any close adherence to the public good: what it requires is service to the private interests of the boss or oneself—and in this connection let us recall, with Veblen, that “the aggregate of discrete individual interests nowise expresses the collective interest” (p. 720). Furthermore, not only the attainment of success, but even its maintenance, generally requires that the wages and business-practices of the noblest of men descend to the level of the sharpest, most unscrupulous competitor. Exceptions to this rule do, of course occur—and they should be fostered—but the exceptions are sufficiently rare and slight as to emphasize the difficulties involved, rather than to depreciate them.

Despite its thousand pages, the present volume finds little or no space for a discussion of nationalism, racial prejudice, war and peace, cultural differences, and other important issues. Scientific knowledge is, to be sure, limited, but probably not more so than for such a topic as law (which receives 62 pages).

What of the future? Thorndike expresses both optimism and pessimism: but his pessimism seems more prominent and convincing than his optimism. On the optimistic side, science will continue to advance, truth will continue to grow, and ultimately, “when man understands men as well as he understands the chemical elements, he may control the explosions of the former as well as those of the latter” (p. 531). We hope so. It should be remembered, however, that truth, science, knowledge, and discovery are not necessarily good: they are good according to their consequences: and determined, resourceful men can convert knowledge to baleful as well as exalted purposes. (Herr Goebbels is a case in point, as are also some of our more gifted lobbyists.) Moreover, the analogy between the physical sciences (or chemistry) and the social sciences is of only limited accuracy. Progress in the physical and biological sciences has been at least partially associated, in one way or another, with possible private profits (not necessarily for the scientist himself); progress in the social field, however, may impair the profits of some, without creating substantial new profits for others. Social progress, in other words, far from being tied to the profit system, is in some important instances likely to provoke strenuous opposition from it. Besides this difficulty, the application of new truths or understanding in the social field meets such obstacles as the emotionalized resistance

of custom; the virtual impossibility of neat, objective proof or demonstration; and the frequent need for widespread coöperation among individuals whose immediate interests are much better served by "free enterprise" (so long as the *others* coöperate). In short, added to the greater difficulty of discovering truth in the social sciences, is the likewise greater difficulty of converting truth in the social sciences to the service of social progress.

On specific issues, Thorndike is perhaps more pessimistic than necessary. (a) Even granting that the quality of population, *P*, plays a very important rôle, social progress *has* been achieved (notably in England and Sweden) despite a stationary level of *P*. We may hope that the limit of such progress has not yet been reached. (b) War is perhaps the most serious problem both of today and the future. Not the brotherhood of man, but periodic butchery, seems to characterize our civilization. The lack of brotherhood, Thorndike considers, is almost inevitable:

Man tends inveterately to form a "closed society." . . . The excluded are of a different color, or religion, or nation, or economic status, etc. . . . One or more of these [classes] may easily become an object of hate . . . [or] of exploitation (p. 739).

No good purpose can be served by wishful under-estimation of the obstacles to brotherhood. But peace is possible with only a minimum of brotherhood, or perhaps even with none. At any rate, the required minimum could conceivably be established through appropriate education and experience. Peace *is* possible—and psychologists can help. Thorndike himself makes a suggestion, which, had it been followed, might have exerted no small influence toward peace:

If psychologists had been consulted about the League of Nations twenty years ago, they would, I think, have recommended that it be given power to hold World Fairs, musical festivals, etc., in one nation after another, to issue money (ostensibly for the convenience of travelers but mainly to make itself known and trusted), to send missions around the world, and to do other things designed to capture the public imagination and make all peoples feel that the League was a grand affair, that it belonged to them, and they to it (p. 868).

(c) A major obstacle to progress, according to Thorndike, is the

low quality of our political leadership. Again and again Thorndike reverts to the idea of a "board of trustees for the welfare of man," "a body of impartial trustees for the welfare of mankind," "a national council of the able, good, and impartial." It is quite possible that the gifted oligarchy which Thorndike envisages would be superior to the more usual political parliament; on the other hand, Thorndike may be over-optimistic as to the possibility of obtaining a truly impartial board, with competence in a sufficiently large number of fields. Be that as it may, it remains true that, in some countries, important social progress *has* been made continuously within the last generation, despite or because of a parliamentary system. Democracy and parliamentary government are not, in themselves, insuperable obstacles to progress.

Thorndike has written a volume which, as indicated at the outset, carries the compelling qualities of deep sincerity and sterling intentions. The issues he deals with are of large and urgent concern. The principal defects of the volume lie in its preoccupation with generalities, and its excessively conservative frame of reference. Society, in its present beatitude, requires a surgical eye; from this point of view, a volume entitled "Human Nature and Social Disorder" would probably be more profitable. Even so, Thorndike's volume must be accepted as a highly valuable contribution. The eminence of its authorship has added respectability and prestige to the psychologist's rôle in social analysis and planning. If the motivating spirit of this volume more widely prevailed, the world would be a better and a happier place to live in.

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(There will always be two pages of book titles, listed in the order of receipt, i.e., the most recently received books will be found at the end of the list.)

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